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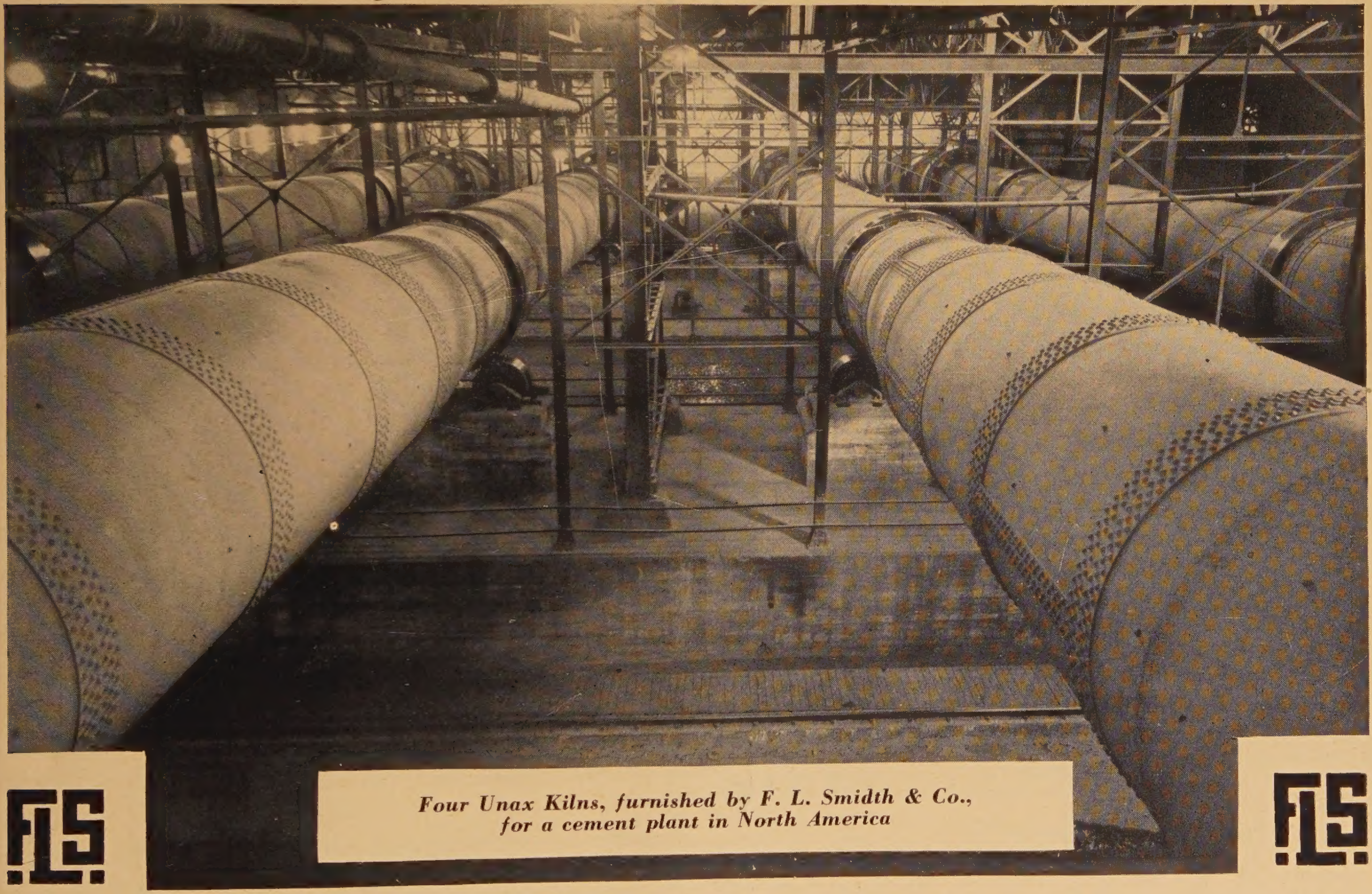

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The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of portland cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

Volume 40 January, 1932 Number 1

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Slurry Filters Save Fuel in Manitowoc Plant

Record of Three Years Proves Value of Filtration—Nine Drum Filters Serve Three Kilns—Increase Kiln Output Ten Per Cent

ABOUT 75 cement plants out of a total of 196 plants located in the United States, Canada, Mexico, and Cuba, are operating under the wet process. Of the 75 wet-process plants, 21 are equipped with slurry filters.

The relatively low percentage of wet-process plants that have slurry filter installations is not in any sense to be interpreted as a reflection on the success of the installations now in operation. To begin with, the application of filters to the cement industry is a development of comparatively recent date, the first installation in this industry having been made in 1925. Time would be required to obtain installations in all plants even if no serious obstacles stood in the way.

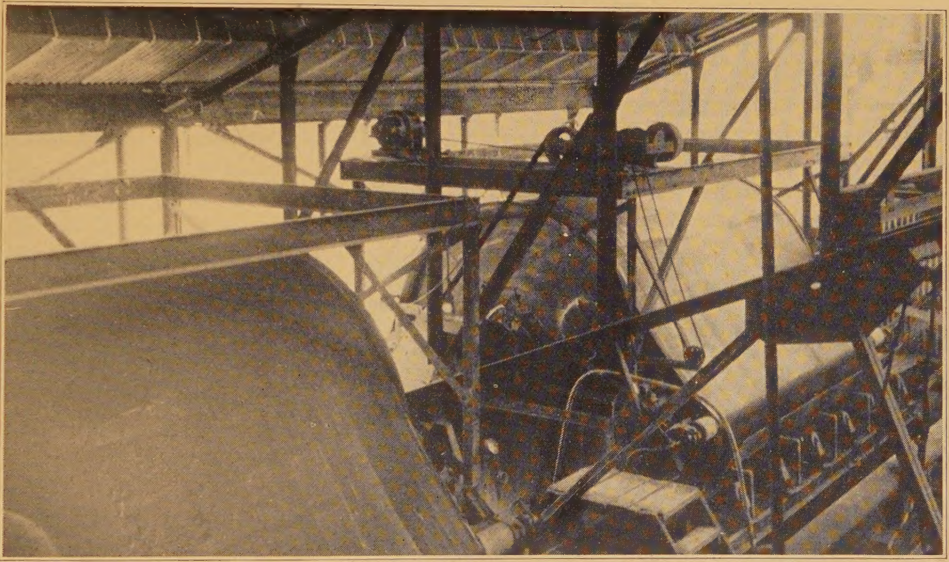

Figure 1. Two of nine drum type filters in operation at Manitowoc plant of Medusa Portland Cement Co.

Some Slurries Not Easily Filtered

Aside from what has just been stated, the fact remains that not all cement slurries can be successfully dewatered. The majority of plants now equipped with filters utilize either limestone and slag or limestone and clay or shale as the raw material. These materials seem well adapted to the filtering methods thus far developed. Some other slurries tend toward a colloidal structure, while still others may contain organic matter, and in either case there is an inclination to clog up the filter cloth and permit only partial filtering of the excess water. These slurries usually have a poor filtering rate, and therefore require a relatively large filtering area.

Each individual plant, in a word, presents an individual problem, the solution of which can be determined only through experimentation with the raw materials employed. Actual test runs of the slurry under consideration will alone determine whether that particular material can be filtered successfully; and if so, what filtering area will be required to supply a uniform kiln feed at the required rate of production. Further tests and adjustments must be made after the installation is in operation, to determine the speed of the filter and the thickness of the layer that will produce a cake of just the right moisture content to prevent stickiness, which might cause formation of mud rings or balling up in the kiln.

Operate Under Low Air Pressure

Filters of cement slurries operate under low air pressure, the pressure being limited to the difference between normal air pressure and that maintained in the partial vacuum created by the vacuum pump. Attempts have been made to develop continuous filters that will utilize pressures higher than can be obtained in this manner, but filters thus far installed in cement plants make use of the vacuum principle.

A Successful Drum Type Installation

Both the disc type and the drum type of filter have been installed in cement plants. An interesting and successful installation of the latter type may be seen at the Manitowoc, Wisconsin, plant of the Medusa Portland Cement Co. This installation, known as the drum type with string discharge, was made in 1928, and consists of a total of nine filters each approximately 12 ft. long and 8 ft. in diameter, so arranged that three filters serve each of three rotary kilns 10 by 160 ft. in size. A limestone-and-clay slurry is employed at this plant. The filters are served by three single-stage 23-in. by 10-in. vacuum pumps each driven by a 40-hp. motor. A vacuum of 26 in. is maintained.

Moisture Reduced to 19 Per Cent

The percentage of moisture in the slurry, as it reaches the filters, runs close to 33 per cent. The filters reduce this moisture to about 19 per cent, just to the point where the cake can be rolled into a ball in one's hand without soiling the hand appreciably. The cake, as discharged from the filter, has a thickness of about 3/16 in.

Discharging the Filter Cake

Figure 1 shows two of the nine filters in the Manitowoc installation. Both these machines were in operation when the photograph was taken. The illustration shows clearly how the complete sheet of cake is being lifted from the cylindrical surface of the filter cloth by means of the strings, spaced 1 in. apart and leading off from the drum tangentially. Figure 2 is a close view of this same feature. Observe how the sheet of cake is cracking as it starts to pass around the discharge roll, as a result of which it is freed from the strings and drops to the belt conveyor which transports it to the kiln-feeding equipment. The empty strings can be seen returning from the discharge roll to the return roll, from which they return to the filter surface preparatory to the start of another filtration cycle.

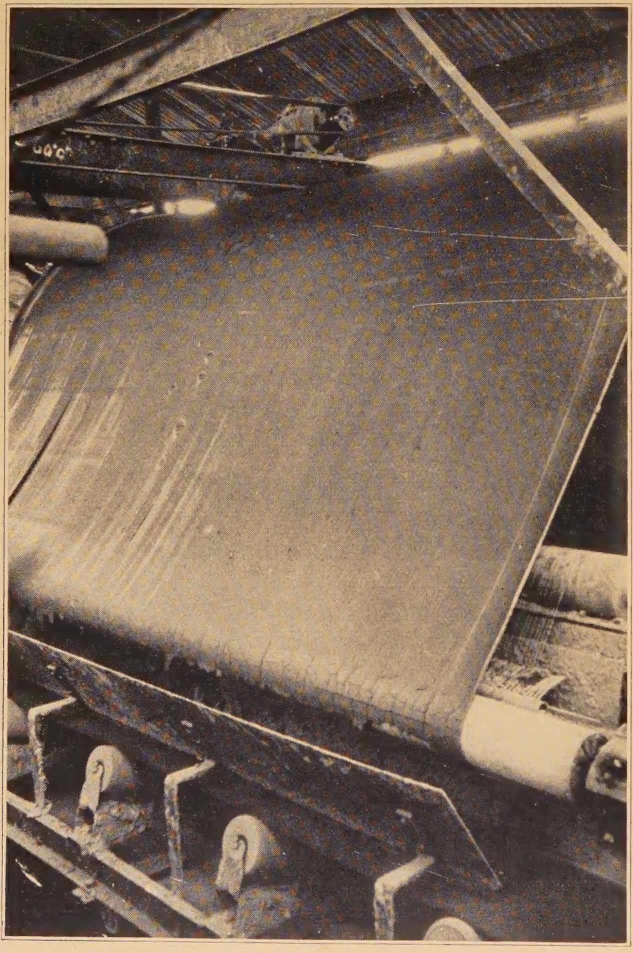

Figure 2. Close-up view showing discharge of filter cake to belt conveyor.

The Filtration Cycle

The filtration cycle is simple enough in its operation. The unfiltered slurry is maintained at a constant level by means of a small continuous overflow from the semicircular filter tank that incloses almost all of the lower half of the filter drum. As the filter cloth surface of the drum rotates slowly through this slurry, a layer of the material is deposited upon it, because of the partial vacuum that is maintained within the compartments on the drum surface by the vacuum pump. This vacuum operates through a series of separate segments of the circumference. When a segment is once freed from the slurry within the filter tank, the layer loses its moisture rapidly at first, the water being drawn through the filter cloth because vacuum is still applied. The filter cloth is a thin, closely woven material, which, because of its thinness, offers less resistance to the formation of cakes, is nonclogging, and maintains its filtering capacity.

The removal of water (always toward the inside of the drum) continues at a decreasing rate until the connection with the vacuum is broken. This break occurs just before the cake is lifted from the surface of the filter cloth. The sheet of cake is lifted from the drum as previously described and as shown in Figures 1 and 2, and discharged to the belt shown most clearly in Figure 2.

In the event that a string breaks, the operator ties a new one to one of the adjacent strings, which leads it around the filter drum. When the end of the new string has made the complete cycle the operator stops the machine momentarily and ties the knot, thereby replacing the broken string.

Mechanical Details of Filters

The mechanical details of the filters are shown in Figure 3, taken from a drawing supplied by the manufacturer. Study of these details, taken in conjunction with the halftone illustrations and the names of the various parts in the upper left-hand part of the drawing, will disclose the nature of the operating mechanism.

Reduced Fuel Consumption; Increased Output

The reduction of the moisture content from 33 to 19 per cent had the direct result of reducing the fuel consumption per barrel of clinker, and increasing the output of the kilns. This may readily be seen as the obvious result, for the fuel formerly consumed in getting rid of the excess moisture is no longer required. Upon entering the kiln the filter cake is dried rapidly and, in consequence, it reaches the calcining and the later clinkering stages more quickly.

Excellent Performance Record

A study and comparison of the records of performance before and after the filter installation at the Manitowoc plant may be made from the summary given below. The installation, as previously stated, consists of nine filters serving three 10-ft. by 160-ft. kilns.

Summary of Performance

Following is a summary of the performance of the installation at the Manitowoc plant:

Slurry moisture, before filtration	33 per cent

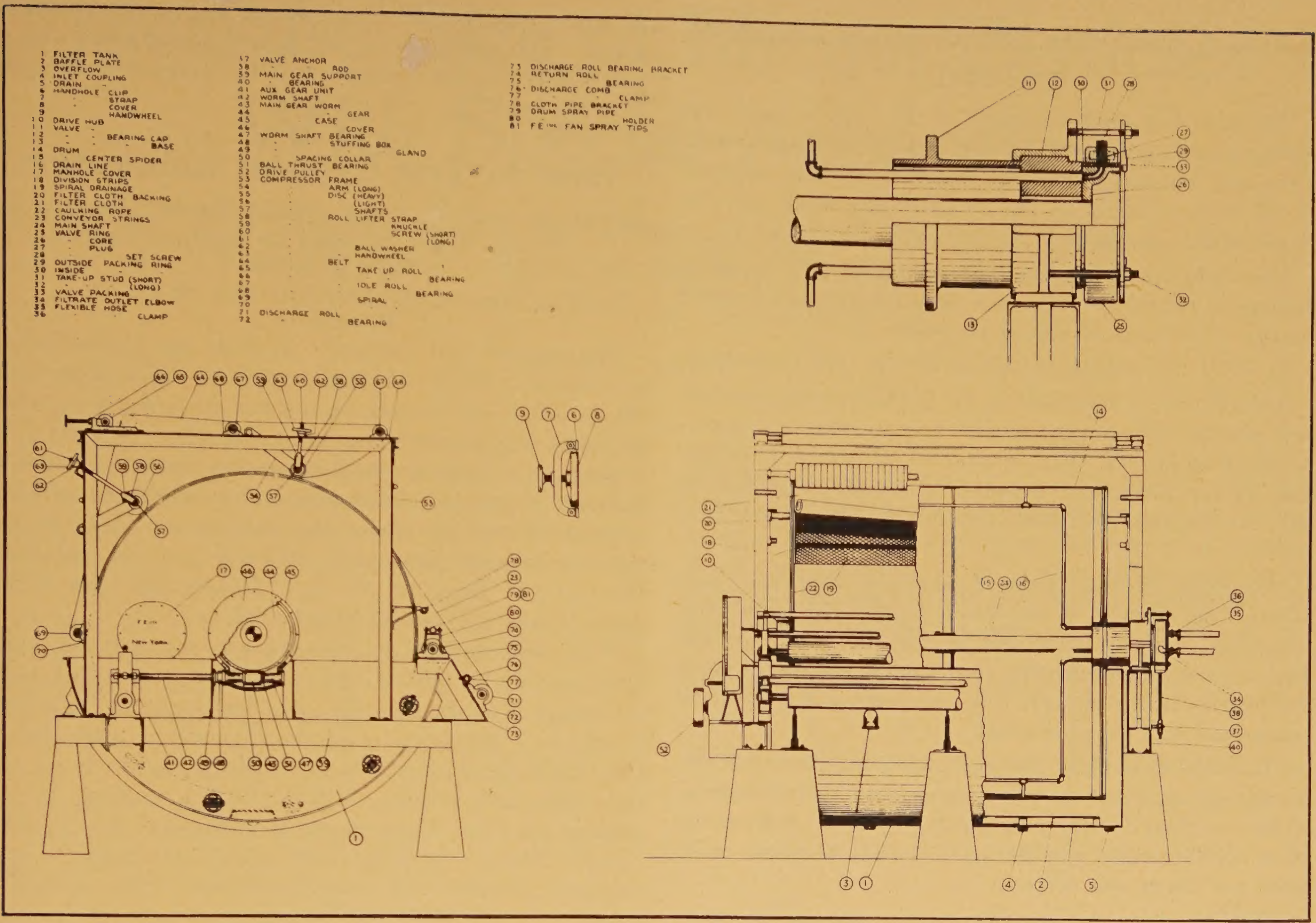

Figure 3. Mechanical details of filter.

Moisture in filter cake, after filtration.........19 per cent
Increase in kiln production due to reduction in slurry moisture content.........10 per cent
Decrease in consumption of pulverized coal, due to reduction in slurry moisture content ...15 per cent

Increased Production Overloads Coolers

From the summary it will be seen that the kiln production was increased by 10 per cent, as a direct result of the operation of the slurry filters. This had the unexpected result of overloading the 8-ft. by 60-ft. clinker coolers, which now were inadequate to handle the increased output. This necessitated the installation of a special lining within the coolers, for a length of 10 ft., at the receiving end. The lining, which consists of an arrangement of hollow plates designed to introduce cold air into the cooler, brings the temperature down from red hot to black hot in a distance of 10 ft.

Acknowledgment

The slurry filter installation here described was designed and installed by Filtration Engineers, Inc., of Newark, N. J.

Iowa Awards 1,000,000-Bbl. Highway Contracts

The Hawkeye Portland Cement Company and the Pennsylvania-Dixie Cement Corporation plants in Iowa will supply half, or 500,000 bbls., of the highway commission's cement quota for 1932.

All but 150,000 bbls. of the remainder will be furnished by the Northwestern States, Lehigh, and Dewey companies. Contracts for 150,000 bbls. have been let to out of state plants.

---

25 Per Cent Increase in Marquette October Shipments

A gain of 25 per cent in shipments is reported for October of this year over that of the same month in 1930 by the Marquette Cement Manufacturing Co., Chicago.

The greatest amount ever handled by the company in one day was a peak reached on October 3 when it broke its own record by shipping 15,000 barrels, according to Theodore G. Dickinson, president.

Oglesby Plant Reopens First of December

The Oglesby, Ill., plant of the Lehigh Portland Cement Co. reopened on December 1, after having been shut down for several months.

Sufficient orders are on hand to require operation for some time, at reduced capacity.

South Dakota State Plant to Run Through Winter

The South Dakota state cement plant at Rapid City will be operated continuously through the winter, according to a statement issued on November 30 by Supt. William Fowden.

Extra Christmas Dividend Is Declared by Ideal

An extra Christmas dividend of 25 cents a share was declared on December 10 by directors of the Ideal Cement Company, Denver, Colo. The regular quarterly payment of 50 cents a share on the corporation's stock was declared at the same time.

The extra was to be payable December 22, to stockholders of record December 15. The regular will be paid January 2 to stock of record December 15.

In 1930 the company paid a 50-cent extra dividend.

According to a statement by R. J. Morse, vice-president and general manager, the surplus accumulated by the corporation in its best years was to be called upon to pay part of the dividends. Surplus is ample, he added, to pay the regular dividends throughout all of the year 1932.

"Earnings of Ideal Cement company in 1931," said Morse, "on account of depressed prices and subnormal shipments, will not cover the regular dividend, but the directors considered that the stockholders should be given the benefit of the surplus built up during the previous prosperous years of operations.

"With the knowledge that the cash position of the corporation is such that the payment of the regular dividends of $2 per share for the year 1932 is assured, and that an extra at this time is justified, a Christmas dividend of 25 cents per share was declared."

Ideal has been paying Christmas extras to its stockholders for more than ten years.

The company was to disburse $447,353.25 for bond interest and for the dividend payments authorized. On January 1, $103,650 in bond interest was to be paid. The regular quarterly dividend amounts to $229,135.50. The extra amounts to $114,567.75.

Aetna Plant Expansion Program to Continue

Further expansion of its Essexville, Mich., plant is planned by the Aetna Portland Cement Co. During the past year and a half $250,000 has been spent on improvements. Capacity has been tripled since its organization eight years ago.

According to O. J. Lingeman, general manager, the plant expansion program has not yet been completed. The average plant employment runs between 115 and 125 men, while employment for about 75 others has been provided on two of the company's three boats which have been operating during the year, and in the trucking division. The addition of another unit is expected to increase the employment by 25 at the plant.

Clinker Cooler Installations in Marquette Cement Plants

The Marquette Cement Manufacturing Company is continuing with a program of new installations at its plants near Oglesby, Ill., and Cape Girardeau, Mo., at an estimated cost approximating $500,000 at the two plants.

This work includes the installation of 15 clinker coolers of a new type, recently tried out at the Oglesby plant as a test. The performance of the test installation was so satisfactory that both plants are to be completely equipped with this type.

How to Test Cylinder Lubrication

Appearance of Cylinder Walls Often Deceptive—White Paper Rubbed on Surface Tests Oil Deposit

By W. F. SCHAPHORST, M.E.
Newark, N. J.

The cement mill mechanic is often non-plussed when it comes to cylinder lubrication, and one can't blame him. He doesn't know whether or not the oil is doing its work properly. He wonders how to go about it.

Here is a method for determining whether or not a cylinder is properly lubricated which originated with an engineer friend of mine. He was getting ready to examine a cylinder preparatory to a test on a new lubricant that he was going to try out. This is the plan which came to him and which he adopted.

When the head of the cylinder was removed the walls and head of the piston looked well lubricated and were pronounced by the operating engineer to be in "excellent condition." My friend took four pieces of white paper and asked the engineer to rub them horizontally on the top, sides and bottom of the cylinder, reaching as far back as possible. These pieces of paper were then marked "Top," "Bottom," "Right Side" and "Left Side" to correspond correctly with actual conditions. They were also dated.

While this particular wall or surface seemed to be well lubricated, very little oil appeared on the four pieces of paper, and the oil was of a rusty color. After the new lubricant had been in use for three weeks they repeated the operation, and the difference in the two sets of papers was so great that the engineer unhesitatingly remarked that he then had ten times more oil on the cylinder walls than before, notwithstanding the fact that the feed of the lubricator had been cut down to feed one-third as much oil as previously.

Shortly after that my friend had occasion to open another cylinder. This was on a new machine which had been running but six months, and when the head was taken off the engineer remarked that he could not ask for better lubrication. To my friend the cylinder seemed well lubricated also but he used the paper test and had the engineer himself do the rubbing.

The paper was applied to the top of the cylinder first and to their amazement the paper showed practically no oil at all. The sides were a little better, and there was too much water in the cylinder to make the test on the bottom. They then repeated the test and the papers came out almost entirely free of oil. The engineer remarked that he was glad he had made the test as it convinced him that the cylinder was not being properly lubricated.

This method of testing cylinders for oil deposits is my friend's own manufacture. He admits that it may be crude and probably not the best, but it is simple and has "saved the day" for him many times. He passes the information on for whatever good it may be to others. If there is a better method of determining when a cylinder is properly lubricated he would be very glad to know about it.

Measure Size of Minute Particles With Special Apparatus

Adapted Especially for Measurement of Particles Finer Than 200-Mesh—Another Method for Coarser Particles —Methods of Procedure

By W. L. GADD, F.I.C.

UNTIL recently the size of small particles of powdered material has generally been expressed as the proportion passing through certain sieves, although elutriators using either air or liquids have now come into use in some industries owing to the difficulties in the manufacture and use of very fine sieves.

It has now been recognized, however, that something more is required and that it is necessary to know the dimensions of the particles, or at least their limitations, and their average size. This has proved particularly important in regard to portland cement because the value of cement as a constructive material depends very largely on the proportion of the finest and hydraulically most active particles, the hydration of which gives rise to the setting and hardening properties of the material.

Actual Measurement Not Practicable

Accurate measurement of the surface of a powder is practically impossible by reason of the varied shapes assumed by different kinds of crushed and ground particles; but comparative figures may be obtained by measuring the mean linear dimensions of a number of them. The true mean diameter of microscopic particles is extremely difficult to determine, as it involves measurement in three dimensions, and it is difficult to measure the thickness of a minute particle under the microscope with even reasonable accuracy. The length, breadth, and thickness of comparatively large particles can be measured by turning the pieces over with fine forceps. A number of coal particles measured in this way were found to have a mean diameter very nearly equal to the arithmetical mean obtained by a method to be afterwards described. Particles of cement grit of a size passing a sieve of 10 meshes per linear inch but retained on a 14-mesh sieve were roughly ellipsoidal in shape, and the mean diameter $\sqrt[3]{L \times B \times T}$ was found to be 4 per cent smaller than the average diameter as measured in one plane.

Shape of Very Small Particles

The shape of microscopic particles of coal or cement, however, is quite different from that of the coarse grits referred to above, being largely composed of thin flakes and splinters which tend to lie upon their flatter sides and have relatively very little thickness. Therefore it can not be assumed that the relation of thickness to length and breadth in the larger particles will hold good for the smaller. The foregoing relates to particles of a mean linear dimension of 10μ to 20μ. The finest particles of cement as commercially ground are of the order of 1μ, and the tendency of these is to assume a nearly spherical shape. Various methods of computing the average diameter of small particles have been employed based on linear measurements, on surface or volume, and on the weight of fractions of different particle diameters. The term average diameter or average particle size can only strictly be applied to the value of $\frac{\Sigma nd}{\Sigma n}$.

Method for Particles Coarser Than 200-Mesh

The method of obtaining this average adopted by the research department of the Associated Portland Cement Manufacturers, Ltd., is as follows: The powder to be examined is lightly scattered on a microscope slide and examined by a two-thirds or one-sixth objective, as required. The microscope eye-piece is fitted with a micrometer scale which is calibrated by means of a stage micrometer in 1/10 and 1/100 mm. Beginning at one corner of the slide, the diameters of the particles are measured in one direction only, without reference to the orientation of the particles, on a line dividing each particle into two apparently equal areas (see Figure 1). Having worked across the slide, it is moved up slightly and another line of particles measured in the same way. Usually from 500 to 1,000 particles are thus measured and the average diameter is obtained by dividing the sum of the measurements by the number of particles measured. Given a sufficient number of measured particles, the law of averages equalizes their orientation and two or more operators will obtain almost exactly the same result when working on different portions of a sample.

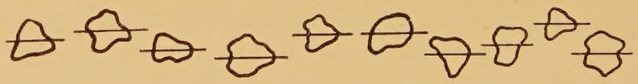

Figure 1. Each particle measured on line dividing it into two equal areas

Special Apparatus Measures Extremely Fine Particles

When large numbers of powders (e. g., cement flours) have to be examined, the microscopic measurement of individual particles is tedious and occupies considerable time. To obviate this, an instrument called the "Obscurometer" was developed. This instrument is illustrated in Figure 2.

The apparatus consists of a metal tube (*B*) mounted in

From *Cement and Cement Manufacture*, July, 1931.

a wooden block (*E*) which carries the small electric lamp (*C*) in the base. Tube (*B*) has a longitudinal slot with a right-angle turn at the bottom to accommodate the side tube of the glass tube (*A*), which rests on an internal collar. The distance from bottom of (*A*) to the lamp is about 4 in. The measuring tube (*A*) is a glass cylinder, 6 in. long, 4/5 in. internal diameter, with flat, ground, and polished bottom, and is fitted with a small side tube close to the bottom. It is graduated in millimeters of length up to 10 cm. Bottle (*G*) is an ordinary small aspirator bottle (150 cc. capacity) fitted with a rubber cork and flexible blowing tube (*H*). This bottle is connected with the side tube of (*A*) by rubber tubing closed by a spring clip (*F*).

The Procedure

A definite volume of the powder is shaken up with a suitable viscous liquid and the suspension poured into bottle (*G*). This is attached to tube (*A*), the spring clip opened, and the liquid blown gently into (*A*), in which it slowly rises. As soon as the filament of the lamp is seen to disappear entirely from sight (looking into (*A*) from above) the spring clip is closed, and the height of the column of liquid in (*A*) read with a lens. The standard "normal suspension" consists of 0.5 gram of finely-ground quartz sand suspended in 100 cc. of clear sugar solution (150 grams pure cane sugar in 100 cc. H_2O). Any transparent viscous liquid which will hold the particles in suspension may be employed, and sugar solution is suitable for sand, coal, or other particles not affected by sugar or water. The most suitable medium for cement is viscous medicinal paraffin (extra high viscosity, as supplied by The British Drug Houses, Ltd.).

As a "normal suspension" contains always the standard volume of powder, the weight taken differs with the material examined. Quartz sand has a density of 2.65 and fresh cement a density of 3.15. Hence to make a "normal suspension" of cement the weight taken is:

$$\frac{0.5 \times 3.15}{2.65} = 0.5943 \text{ gram.}$$

Thus 0.5943 gram of fresh cement suspended in 100 cc. clear viscous paraffin is a "normal suspension" of cement.

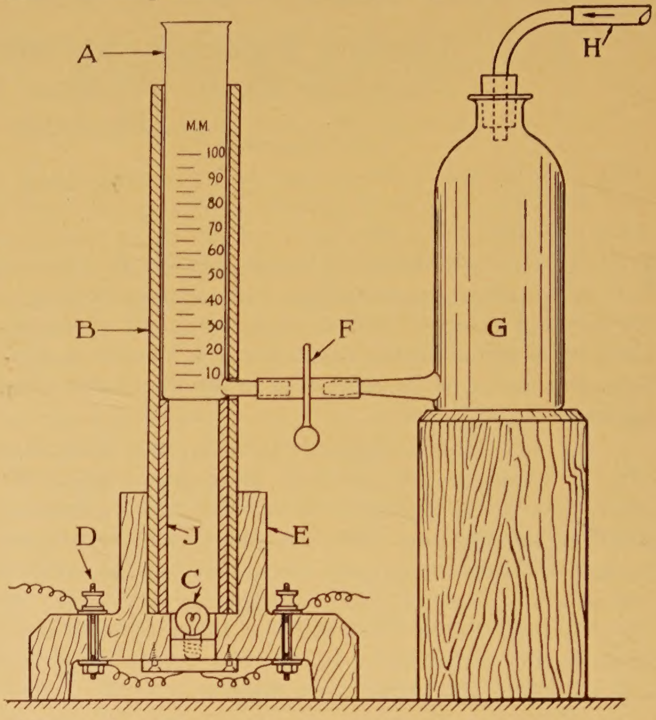

Figure 2. "Obscurometer" apparatus for measuring extremely fine particles

Similarly, a "normal suspension" of coal dust (density 1.40) would be:

$$\frac{0.5 \times 1.4}{2.65} = 0.2641 \text{ gram in 100 cc. liquid.}$$

The suspension of cement, coal, and other particles is assisted by first slightly moistening the powder with suitable liquids before adding the viscous medium; e. g., just wetting cement with two or three drops of dried paraffin oil assists the suspension in the thick paraffin, while coal dust can be wetted with alcohol before mixing with sugar solution.

The instrument works best when the height of the column in tube (*A*) is between 3 cm. and 5 cm., and the concentration should be arranged to give a column height between these limits. A "normal suspension" of very fine particles may give an obscuring height of 1 cm. or less and the range between visibility and invisibility of filament is then too small for accuracy. In these cases less cement is taken so as to make a $\frac{\text{Normal}}{2}$, $\frac{\text{Normal}}{3}$ or $\frac{\text{Normal}}{4}$ suspension. For larger particles a normal suspension which gives a column height of more than 5 cm., 2 Normal, 3 Normal, etc., may be used, but in any

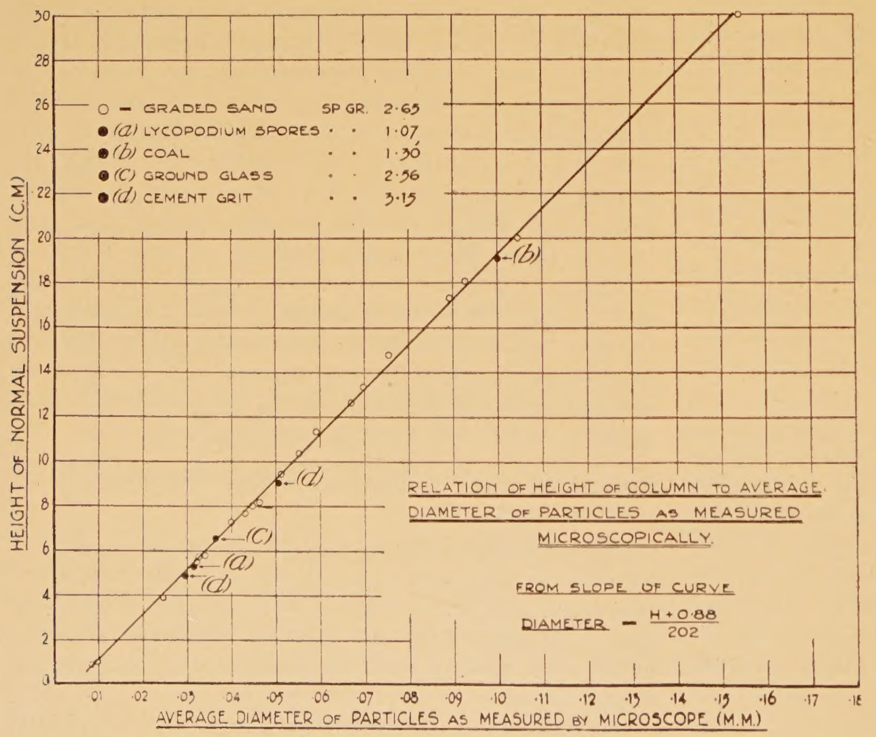

Figure 3. Graph illustrates wide application of formula

case the height of column read off in tube (*A*) must be corrected to normal by dividing in the former case and multiplying in the latter.

For example:

(1) Cement $\frac{N}{2} = \frac{0.5943}{2} = 0.2971$ gram cement in 100 cc. thick paraffin.

Obscuration height in tube (*A*) $= 2.50$ cm.

Corrected to Normal $= \frac{2.5}{2} = 1.25$ cm. normal height.

(2) Sand $2N = 0.5 \times 2 = 1$ gram in 100 cc. sugar solution.

Obscuration height of column in tube (*A*) $= 5.65$ cm. $5.65 \times 2 = 11.20$ normal height.

The average diameter of the particles is found from the normal height of the obscuration column in cm. by the formula $\frac{H + 0.88}{202}$ which is derived from the slope of a straight-line curve connecting H/diameter. Thus in the examples given the average diameters of the cement and sand would be

(1) $H = 1.25 \text{ cm.} \quad \frac{1.25 + 0.88}{202} = 0.0105$ mm.

(2) $H = 11.20 \text{ cm.} \quad \frac{11.2 + 0.88}{202} = 0.0598$ mm.

Formula Applies to Diverse Materials

This formula applies to such diverse materials as coal, cement, sand, powdered glass, and vegetable spores. The indications given by the instrument are not affected by the brightness of the lamp (*C*), which need not be standardized. The temperature of the paraffin or other viscous medium used should be between 15 and 18 deg. C.

The instrument was originally calibrated with a number of samples of quartz sand ground to different degrees of fineness, the height of the obscuring column being plotted against the mean linear dimensions of the particles obtained by measuring 1,000 to 2,000 such particles under the microscope. The applicability of the instrument to other substances was also demonstrated with samples of ground coal, glass, and cement, and also with natural vegetable spores.

From the graph shown in Figure 3 it will be seen that the plotted points all fall very nearly upon a straight line connecting the height of a normal suspension with the mean linear dimensions of the particles as measured microscopically.

Apparatus Limited to Very Fine Particles

The use of the instrument is limited by the size of particle that can be held in suspension without falling through the liquid. Therefore it is not suitable for particles of cement larger than are retained upon a sieve of 200 meshes per linear inch. Residues on this and coarser sieves are usually measured microscopically in the manner indicated in the early part of this article.

1,150,000-Bbl. Contracts Awarded by State of Wisconsin

Award of contracts for 1,150,000 bbl. of cement for the Wisconsin 1932 state highway construction program, five months earlier than usual, was made by the highway commission on December 3.

The Manitowoc Portland Cement Co., only Wisconsin manufacturer, received the largest contract, for 425,000 bbl. Other firms received portions as follows: Marquette, Chicago, 200,000 bbl.; Petoskey, Michigan, 150,000; Lehigh, Chicago, 125,000; Universal, Chicago, 100,000; and Alpha, Chicago; Huron, Detroit; Lone Star, Indianapolis; Dewey, Davenport, Ia.; and Northwestern States, Mason City, Ia., each 25,000 bbl. The Manitowoc company is also to furnish 60,000 bbl. contracted for in 1931 but which were not delivered. All prices were based on 90 cents at the factory.

Any increase or reduction within a 25 per cent limit will be distributed among the ten companies in proportion to the allotments announced. New bids will be asked for amounts in excess of 25 per cent increase.

The orders total more than 5,750 carloads, the commission pointed out, and will provide 577,300 man hours of work in the industry.

"This means the employment of 722 men for 100 days or 240 men for a full year," the commission stated. "On the basis of an average haul of 150 miles the transportation of this tonnage requires the employment of 1,135 railroad men for 100 days."

Materials Handling Institute Formed to Further Use of Machines

The Materials Handling Institute was formed at an organization meeting held at Cleveland, Ohio, on December 8. More than seventy representatives of materials handling equipment manufacturers attended.

Being primarily educational, the object of the association is to promote a more intense mechanical handling consciousness and a better understanding of the relationship in a co-operative way between the various groups.

The meeting adjourned to the week of May 2 to 6, during the American Foundrymen's Association meeting at Philadelphia.

The following were elected as officers: F. E. Moore, Matthews Conveyor Co., president; J. B. Webb, J. B. Webb Co., vice-president; H. W. Standert, Northern Engineering Works, treasurer; J. A. Cronin, Materials Handling and Distribution, secretary.

A board of governors was also elected, one representative being chosen from among the manufacturers of each type of equipment.

Narrowing the Gap Between Present Shipments and Year Ago

While there is little to enthuse about in the fact that November cement shipments were 18.5 per cent less than November, 1930, there is some consolation hidden in those figures, nevertheless.

July shipments were 22.9 per cent below the same month of 1930, August 25.3, September 24.4 and October 20.8. With November at 18.5 per cent, there is a very definite slackening of the downward curve.

Similar trends are being shown in other industries, and some comfort may be gotten out of the cement industry's November showing.

British to Issue More Stringent Cement Specification

By A. C. BLACKALL

The current British standard specification for portland cement was issued in 1925. It will shortly be superseded by a considerably more stringent specification which requires a fineness of 10 per cent on the No. 180 sieve, and a neat tensile strength of 600 lb. per sq. in., with a 1:3 sand-cement mortar test of 325 lb. per sq. in.

Even these last figures scarcely represent recent improvements in the quality of the British product, for the average strength of modern portland cement is now more like 750 lb. neat and 400 lb. 1:3 mortar at seven days, while, according to the Portland Cement Testing Works and Chemical Laboratories, the residue on a No. 180 sieve rarely exceeds 5 per cent.

Cement Imports Fail to Aid Lot of American Manufacturers

Dumping of European-made cement in trade centers along the Atlantic seaboard is adding to the difficulties already confronting the cement industry there, according to Allen E. Beals in the current Dow Service Daily Building Reports and the *New York Times* of November 30.

At least one opinion attributes the dumping to England's departure from the gold standard. English cement manufacturers are said to be overstocked and find it necessary to get rid of their heavy inventory by letting it out in the American market.

Comments by importers of foreign cements indicated, however, that they looked at the situation with less apprehension than their American competitors.

A less optimistic view of the situation is taken by Frank H. Smith, president of the Lawrence Portland Cement Co.

"I do not see any reason why the American builder should not be made fully aware of the situation that cement and perhaps other building material manufacturers serving the Atlantic Coast markets are beginning to confront," said Mr. Smith.

"Once before we had to face it and so long as England stayed on the gold standard we were able to hold our own competitively on this side of the ocean. With tariff help we were able to protect our American workingmen in their jobs.

"After the close of the war the foreign cement manufacturers, at that time principally Belgian, found themselves with no market over there for their products and they turned to this country to find one.

"Congress helped the building industry a little, but really not enough to wholly safeguard the manufacturers doing business in the Atlantic Coast line markets, as shown by the fact that prices of American-made cement gradually fell to within hailing distance at least of that asked for the foreign-made product and there the situation has since stayed, off and on.

"Now a new situation has arisen.

"England's departure from the gold standard, however temporary, literally forced the quick marketing of quantities of cement, and no doubt huge quantities of other materials. Since ours is the only comparatively high-priced market in the world, their cement is coming over, in spite of our already lowered prices, and so a new problem pends.

"Ten years ago the appeal was based upon helping the soldier-Americans to get back into their jobs in American industry. Today the call is far more appealing. Not only are many of those former doughboys out of work, but some four million of their fellow-countrymen and their dependents are in distress.

"Everybody wants to see them headed toward prosperity once more, but that happy eventuality will have to be still further deferred unless those who build, however small their need for structural supplies may be, insist upon buying, specifying and using American-made materials."

Cement Required for Concrete Roads and Street Pavements

While it is impossible to determine the quantity of cement required for any particular group of uses coming under the classification of miscellaneous private and public construction, a fairly accurate determination may be made of the quantity used in the construction of concrete roads, streets, and alleys.

This estimate is made possible through the figures on concrete paving awards given out by the Portland Cement Association. It is necessary, in addition, to make certain assumptions. It may be assumed, for instance, that the average cement content is 1.5 bbl. per cu. yd. of concrete, since this figure is quite generally accepted by highway engineers. Assume further that the average thickness of the paving slabs is 8 in.

Knowing the number of square yards awarded, the following tabulation results from the figures assumed:

	Barrels of Cement Consumed, in Year		
	1929	1930	1931
Concrete roads	30,900,000	36,000,000	37,300,000
Concrete streets and alleys	15,700,000	12,600,000	8,000,000
All other uses	122,837,000	110,144,000	81,700,000
Total cement shipments	169,437,000	158,744,000	127,000,000[1]

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[1] Includes estimated shipments for month of December.

The quantities shown opposite "All other uses" are simply the differences between the total shipments and the amounts estimated as having been used in concrete roads, streets and alleys. These totals include the cement used in the concrete base of other types of pavement, in general concrete construction work, in concrete products, and in masonry mortars. The large drop in this figure in 1931, as compared with 1930 and 1929, gives rise to the hope that 1932 may bring about some recovery.

Contracts Awarded for Indiana State Highway Cement

Contracts for supplying 237,363 bbl. of cement for use in paving 59.5 miles of Indiana state roads were awarded to twelve companies by the state highway commission on December 7. Indiana firms were awarded contracts for slightly less than half.

Prices are somewhat lower than those of 1930, according to John J. Brown, commission director.

EDITORIAL

Research Is Needed Now

THE reduced production of portland cement in the United States in 1931 temporarily carries the industry back to where it was in 1923. How temporary this condition is remains to be seen.

There is an important difference between the production records of 1931 and 1923, one that lies at the bottom of most of the troubles that beset cement manufacturers. Eight years ago the production of 137 million barrels was only about 15 per cent below the manufacturing capacity. As everyone knows, the 1931 production of 127 million barrels is slightly less than half the present capacity.

This fact emphasizes, as nothing else could, the need for large-scale marketing research and promotion, with the view of broadening the scope of uses for concrete and concrete products. Not only must the existing markets for cement be widened, but new uses must be developed in fields where cement and concrete are not now recognized as a factor.

It seems inconceivable that the cement industry can wait much longer before taking some major step that will make renewed team-work possible. With that accomplished, new and enlarged markets can and will be developed.

The Cost of Concrete Houses

SINCE publishing the editorial in the October (1931) issue under the heading of "Concrete Houses As Cement Market," a representative of "Concrete" has obtained exact figures on the subcontracts for a six-room concrete house and one-car garage built in a metropolitan suburb in 1928.

The figures emphasize a fact that many home-builders have learned to their sorrow—namely, that many things enter into the construction of a house.

The six-room house in question represents advanced development of the concrete house. The foundation walls and the basement floor are of concrete. The first floor is a 6-inch reinforced concrete slab, the second floor and roof are wood joisted construction. Exterior walls are 8-inch haydite concrete masonry units, coated with portland cement stucco on the outside and California prepared stucco on the inside.

But here are some important facts. All the concrete and concrete masonry work, including the foundation walls, basement floor, reinforced concrete first floor, exterior walls and exterior stucco, sidewalks and steps, cost only 21.5 per cent of the total.

The carpentry work, including cabinet work, cost 27.4 per cent of the total, while the plumbing, heating plant and electrical work amounted to 16.8 per cent.

The cost of the plastering alone was 10.9 per cent of the total, and the painting work alone cost 4.7 per cent.

The remaining subcontracts, including hardware, sheet metal work, sash and glazing, tile work, and various other items, amounted to 18.7 per cent of the total.

These percentages may readily be visualized in dollars when applied to a house costing $10,000. They disclose the truth that the concrete work of a concrete house costs less than a fourth of the total.

These figures prove that attention must be given to the present high cost of plumbing, heating, electric wiring, plastering, and numerous other items, as well as to the carpentry and concrete work, if concrete house construction is to be undertaken on a large production basis.

It may be accepted as a foregone conclusion that the potential market for cement in concrete house construction can never be developed unless attractive homes of this type can be sold at a price much below the prices of the past decade. It will be futile to attempt substantial reductions unless the principles of mass production are applied to all the factors that make up the completed house.

The character of the problem is clear enough. The great task in the development of this market lies in the promotion and financing of the undertaking.

A Few Cents Per Barrel

MANY cement mill chemists and plant engineers will support a complaint recently registered by one of their number. "We get little encouragement," he said, "in return for the efforts we are making toward trimming the costs of production. When, after long study and much labor and the exercise of all the ingenuity at our command, we succeed in shaving off a few cents per barrel in production costs the advantage is promptly passed on to the consumer by the sales department, in the mad scramble for business."

It can hardly be denied that this complaint has much to support it. Neither can it be denied that the sales managements of some cement companies have run riot, and that there is dire need for calmer minds in that branch of the industry.

But after the truth of these assertions is admitted, the fact still remains that cement mill chemists and plant engineers should continue their efforts to reduce production costs. The few cents per barrel trimmed off here and there may be just the difference between surviving and not surviving, so far as individual plants are concerned.

Lost-Time Accidents Reduced 47 Per Cent

Review of Year of Accident Prevention—Dedications Stimulate Morale—Regional Meetings Well Attended

By A. J. R. CURTIS
Assistant to General Manager, Portland Cement Association, Chicago, Ill.

It is in times such as the present, when men are required to do the unusual and the trend is to economize on repairs, renewals, and emergency equipment of various kinds, that the principles and methods followed in accident prevention work are put to the test. The work administered by the Committee on Accident Prevention and Insurance has centered around teaching men to think safely as a matter of habit; far less attention has been paid to formulating rules governing specific detail duties. Recent results would seem to confirm again the committee's viewpoint.

Accidents 47 Per Cent Below Last Year

The accident experience of the past few months is of more than usual interest. While unable as yet to estimate the reduction this year in the number of men at work, man-hours of exposure or the quantity of cement produced in reporting mills, the reduction in accident frequency has been far greater than could be reasonably accounted for through the scaling down of operations. Considerable hazard has been added by necessary "doubling up" on certain jobs and extending the responsibility of both workmen and those employed in supervisory capacities.

During the first ten months of 1931, 133 member plants reported 191 lost-time and 15 fatal accidents. Figures received from 129 plants for the corresponding period of 1930 shows 369 lost-time and 18 fatal accidents. With four more plants reporting there has been a reduction of 47 per cent in the total number of reportable mishaps.

Making Events of Dedications

Since the spring meeting, exercises in connection with the dedication or re-dedication of association trophies were held at 41 mills. Among speakers and guests of prominence on these occasions were two governors, several senators and congressmen, many members of state legislatures, mayors and leading industrialists. From a public, as well as an employe relations standpoint, the 1930 trophy contest proved exceptionally valuable.

The June "No-Accident" contest was again successfully conducted in 1931, establishing a new low record for this 30-day period so far as frequency is concerned, although from the standpoint of severity the results were disappointing. With 135 mills enrolled a total of 10 lost-time accidents and 3 fatalities were reported from 12 plants. One mill suffered two lost-time accidents, 3 mills suffered one fatal each, and 8 mills had one lost-time accident each. This contrasts with the record of June, 1930, when 129 plants reported 28 accidents, none of which resulted fatally.

Regional Safety Meetings

Twelve regional safety meetings were held during 1931. The character of papers presented at these meetings showed improvement and there has been considerable demand for reprints from both member companies and trade journals. The attendance at these meetings was greater than in previous years, there being an average of 108 persons present at the 1931 meetings as compared with an average of 99 at the 1930 meetings.

In connection with trips made in attending the regional safety meetings and the trophy dedication exercises, the safety engineer visited 25 cement mills and quarries at the invitation of the local superintendents. During these visits plant safety programs were discussed and counsel given on local problems. At the request of superintendents, safety inspections of several plants were made.

Again, in 1931, no small part of the success of the safety program has been due to the excellent co-operation afforded by member company officials who have served on committees, appeared and spoken at the regional safety meetings as well as at the safety dedication ceremonies. Help of this kind never fails to inspire the superintendents and workmen to greater efforts.

New Books and Pamphlets

Heat Transfer Through Refractories

RELATIVE HEAT TRANSFER THROUGH REFRACTORIES. By A. S. Watts and R. M. King, professors of ceramic engineering at Ohio State University. Published as Bulletin 64 of the Engineering Experiment Station.

This bulletin covers the development of a practical control method for the determination of relative heat transfer through refractories. It also includes 13 tables of data on composition, temperature gradients, insulating values, heat transfer values, and porosity of a number of samples of brick furnished by many well known manufacturers of refractories.

Bulletin 64 is priced at 50 cents per copy but a limited number are available for free general distribution. Copies may be obtained without charge by writing the Director, Engineering Experiment Station, the Ohio State University, Columbus, Ohio.

Belt Drives Investigation

BELT DRIVES WITH CAST-IRON PULLEYS AND WITH PAPER PULLEYS. By C. A. Norman and G. N. Moffat, of department of mechanical engineering of the Ohio State University. Published as Bulletin 62 of the University Engineering Experiment Station.

Investigation was made of the transmissive power of oak-tanned leather belts and rubber belts on cast-iron and paper pulleys to ascertain the transmissive power of these various combinations, particularly at small angles of contact. It was found that paper pulleys give excellent transmissive power with both kinds of belts, but that they were particularly effective in improving that of rubber belts.

A description of the tests, photographs of the apparatus used, and 25 graphs presenting results of the tests are included in this bulletin, which may be obtained without charge by addressing the Director, Engineering Experiment Station, Ohio State University, Columbus, Ohio. Bulletin 62 is priced at 25 cents per copy, but a limited number are available for free general distribution.

Quarry Operations and Costs At Trinity Plant Near Dallas

Summaries of Quarrying and Crushing Costs—Safety Organization a Success — No Lost-Time Accidents in Entire Plant in Two Years

By J. WILLIAM GANSER[1]
Chief Chemist, Trinity Portland Cement Co., Dallas, Tex.

IN this final installment of this article, the wage scale at the Trinity quarry and the safety organization are described, followed by detailed cost summaries.

Wage Scale

All wages are paid on an hourly basis, except to the foreman and shovel engineer, who are paid by the month, and to the drillers, who are paid for the footage drilled. The normal wage scale is as follows:

Position	Number of men	Wage
Foreman	1	$250.00 per month
Engineer (shovel)	1	200.00 per month
Engineer (locomotive)	2	.55 per hour
Craneman	1	.55 per hour
Fireman	3	.375 per hour
Brakeman	2	.35 per hour
Track foreman	1	.425 per hour
Driller	2	.07 per foot
Car repairman	1	.55 per hour
Car repairman	1	.50 per hour
Laborer	15	.325 per hour

Safety Organization

The "Safety" idea has been so thoroughly instilled into the men that there has not been a lost-time accident in the quarry since November, 1927. The quarry foreman is on a committee with the other foremen from the mill, who are compelled to attend every safety meeting. Two general meetings a month are held and at least one-half of the quarry men attend each meeting, thereby making each quarry man attend one safety meeting a month.

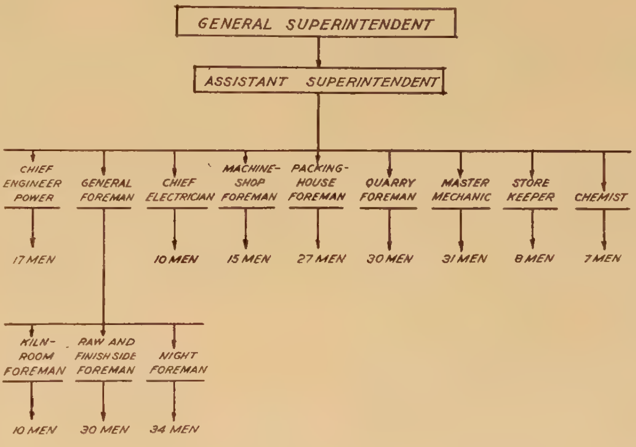

Figure 7. Organization chart of entire plant

During the year 1928 the plant was divided into seven safety groups, as follows:

1. Quarry.
2. Raw-grinding department.
3. Machine shop and laboratory.
4. Yard gang and finishing department.
5. Packing department.
6. Electricians, stockroom and office men.
7. Power house and kiln room.

Each of these groups comprised from 25 to 35 men. With all of these groups trying to avoid accidents, the plant ran during 1928 and 1929 without a lost-time accident.

At the semi-monthly meetings, which have been entirely in charge of the author, a monthly bulletin, "Significant Accidents," of the Portland Cement Association, is read. Every accident reported that could have occurred at our plant is thoroughly discussed, in order to benefit from the experience of other plants. Weekly inspection reports of the plant are read, and recommendations are discussed and approved if thought practical. A safety engineer from the insurance company visits one of the meetings each

TABLE 2

Operating Costs Per Dry-Ton of Stone Mined

	1 Labor	2 Super-vision	3 Air drills steel	4 Power cost	5 Fuel cost	6 Explo-sives cost	7 Other supplies	8 Total
Mining:								
Drilling	$0.0103	——	$0.0011	——	——	——	——	$0.0114
Blasting	.0030	——	——	——	——	$0.0433	——	.0463
Loading	.0472	$0.0051	——	——	$0.0357	——	$0.0159	.1039
Transportation	.0902	——	——	——	.0244	——	.0135	.1281
Miscellaneous	.0184	.0050	——	——	——	——	.0105	.0339
Crushing	.0166	——	——	——	——	——	——	.0166
Grinding	.1422	——	——	$0.1144	——	——	——	.2566
Elevating	.0027	——	——	——	——	——	.0015	.0042
Conveying	.0021	——	——	——	——	——	.0005	.0026
Drying	.0096	——	——	——	.1622	——	——	.1718
Miscellaneous plant	.0507	——	——	——	——	——	.0719	.1226
Total operating costs	$0.3930	$0.0101	$0.0011	$0.1144	$0.2223	$0.0433	$0.1138	$0.8980

Overhead and miscellaneous costs per ton are as follows: Depreciation, $0.03; depletion, $0.01; taxes, $0.01; insurance, $0.01, and miscellaneous overhead, $0.02, which together with operating costs give a total of $0.978 per dry-ton of stone mined.

Reprinted from U. S. Bureau of Mines Information Circular 6498.

[1] One of the consulting engineers, U. S. Bureau of Mines.

TABLE 3

Summary of Costs in Units of Labor, Power, and Supplies

A. Labor (man-hours per ton):	Mining	Crushing	Total
Drilling	0.0197	--------	0.0197
Blasting	.0080	--------	.0080
Loading	.840		.0840
Haulage	.2090	--------	.2090
Miscellaneous	.0480	--------	.0480
Supervision	.0120	--------	.0120
Total labor	.3807	--------	.3807
Average tons per man-shift	--------	--------	26.27
Labor, per cent of total operating cost	--------	--------	43.76
B. Power and supplies:			
Explosives (lb. per ton)	--------	--------	.2516
Total power (kw.h. per ton)	--------	--------	29.60
Shovels			.0000
Locomotives	--------	--------	.0000
Drills	.0800	--------	.0800
Crushing	--------	2.2330	2.2330
Grinding	--------	22.8482	22.8482
Elevating	--------	1.4544	1.4544
Conveying	--------	1.4544	1.4544
Drying	--------	.9467	.9467
Shops	--------	.2780	.2780
Lighting		.3053	.3053
Fuel:			
Gas for drying rock and shale (cu. ft. per ton)	--------	--------	926
Coal for shovels and locomotives (lbs. per ton)	--------	--------	18
Supplies and power, per cent of total operating cost	--------	--------	55.11

month, giving us a safety talk and his experience in other industries. The accident record of this plant since 1927 is as follows:

ACCIDENT RECORD, 1927-29

Year	Severity rate	Number lost-time accidents	Days lost	Total man-hours worked
1927	0.203	12	167	823.119
1928	.000	0	0	798.431
1929	.000	0	0	799.355

Cash Prizes and Barbecues

During the Christmas holidays of 1928 and 1929, the company, to show its appreciation of the co-operation of the men in this safety work, gave each man a check for 10 dollars, and on the fourth of July of each year an old-fashioned southern barbecue was given to the men and their families.

In the fall of 1929 about 75 men were given the first-aid course of the U. S. Bureau of Mines. Since then much time has been given to this instruction in order to teach every man in our organization the benefits derived from first-aid training.

TABLE 4

Detailed Average Shovel Costs, Direct Operation

Shovel operation	Cost of stone Total	Per ton
Engineers	$ 2,400.00	$0.0081
Cranemen	1,818.85	.0061
Firemen	1,240.12	.0042
Foremen	3,000.00	.0101
Pitmen	4,103.45	.0138
Other operating labor	1,884.85	.0064
Total operating labor	14,447.27	.0487
Fuel or power	10,568.67	.0357
Grease and lubricants	285.06	.0010
Other operating supplies	163.26	.0006
Total supplies	11,016.99	.0373
Shovel-repair labor	1,426.37	.0048
Shop labor	1,265.28	.0043
Repair supplies	2,593.45	.0088
Total repairs	5,285.10	.0179
Total shovel operation	30,749.36	.1039

We feel proud of our safety organization, as it has enabled us to complete two successive years without a lost-time accident, thereby making us the possessors of a Portland Cement Association trophy.

TABLE 5

Detailed Summary Costs—Direct Operation

	Cost of stone Total	Per ton
Total all shovels	$30.749.36	$0.1039
Drilling:		
Operating labor	2,703.82	.0090
Operating supplies	313.27	.0011
Repair labor	167.46	.0006
Repair supplies	194.04	.0007
Total drilling	3,378.79	.0114
Blasting:		
Labor	878.00	.0030
Explosives	12,794.00	.0433
Total blasting	13,672.00	.0463
Haulage:		
Locomotives	12,804.22	.0433
Cars	6,700.60	.0226
Track maintenance	18.390.19	.0622
Total haulage	37,895.01	.1281
General charges	10,018.21	.0339
Grand total	95,713.37	.3236

Organization and Summaries of Costs

Figure 7 shows the organization chart for the entire plant. Tables 2, 3, 4, and 5 contain summaries of costs covering the full year of 1929. The material loaded during this period amounted to 295,768 tons of 2,000 lb., the overburden having been included with the stone. The weight of the loose material was 2,025 lb. per cu. yd. A No. 70 Marion shovel with a 2½-yd. dipper was used.

Quarrying, Crushing and Grinding at North American's Quarry

Methods and Costs at Catskill Plant Described in Bureau of Mines Circular—Crushing Plant Handles 1,500 Tons of Stone Daily

THE methods used and the cost of quarrying, crushing and grinding limestone at the Catskill quarry of the North American Cement Corporation are described in Information Circular 6522, by W. J. Fullerton and A. W. Cox, recently published by the United States Bureau of Mines, Department of Commerce. This is one of a series of papers prepared for and published by the Bureau of Mines, describing methods and costs in cement plant quarries throughout the country.

Geology

Following a brief history of the early development of the cement industry in that particular section, the report describes the geology of the formations worked for stone and the methods used in prospecting and sampling materials.

Figure 1 shows an elevation of the quarry with the limits of the present working face. The Devonian beds in which the quarrying operations are conducted are folded into a series of anticlines and synclines, with the folds strongly developed along a general north-south strike. Another series of folds has an east-west strike, but is not so pronounced. The formations are disturbed by a series of overthrusts, rather closely spaced and having an easterly dip. The overburden varies from 0 to 5 ft. in thickness and consists of glacial sand and clay deposits with a small amount of siliceous material from the Oriskany.

The limestone is of the Esopus, Alsen, Becraft, New Scotland, and Coeymans designations. The Becraft beds are high in calcium carbonate, and quarrying operations are conducted largely in them, with the method of quarrying determined by their position.

The vertically dipping Becraft stone at the east end of the quarry is difficult to drill due to seams, faults, and an occasional small cave. Toward the west, where the dip is not so steep, drilling is less difficult, although the greater hardness of the New Scotland stone underlying the Becraft at the western end of the quarry slows up drilling. About one hole out of ten is lost, due to broken drills, seams causing the drill to lose direction. Most of the trouble is encountered in the vertically folded stone at the east end of the quarry.

Quarrying Methods

The quarry methods are described in detail and illustrated by line drawings. Drilling is by churn drills, the performance rating of which is presented in tabular form. Blasting practice is explained, both as to primary and secondary practice, showing the relative importance of each, the kinds and amounts of explosives used and how loaded.

Figure 2 shows a plan of the quarry and track. The quarry face is approximately normal to the strike of the folding. The present working face runs nearly east and west, and is about 500 ft. long by 60 to 84 ft. high. The quarry is served by a single-loop standard-gauge track.

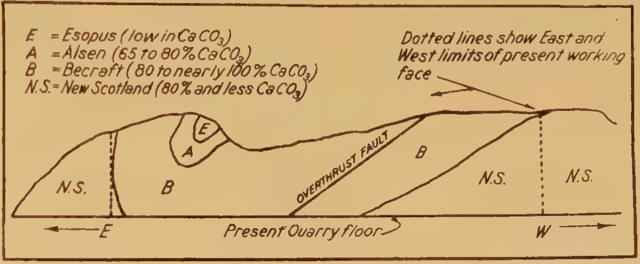
E = Esopus (low in $CaCO_3$)
A = Alsen (65 to 80% $CaCO_3$)
B = Becraft (80 to nearly 100% $CaCO_3$)
N.S. = New Scotland (80% and less $CaCO_3$)
Dotted lines show East and West limits of present working face
E
A
N.S.
B
OVERTHRUST FAULT
B
N.S.
N.S.
E
Present Quarry floor
W

Figure 1. Elevation of quarry, looking south

The primary crusher is situated approximately north of the working face and about half a mile distant.

The light overburden, varying from 0 to 5 ft., is not removed by stripping, but is shot down and handled with the stone. It is highly siliceous, and silica is a necessary component for the cement mixture. The percentage com-

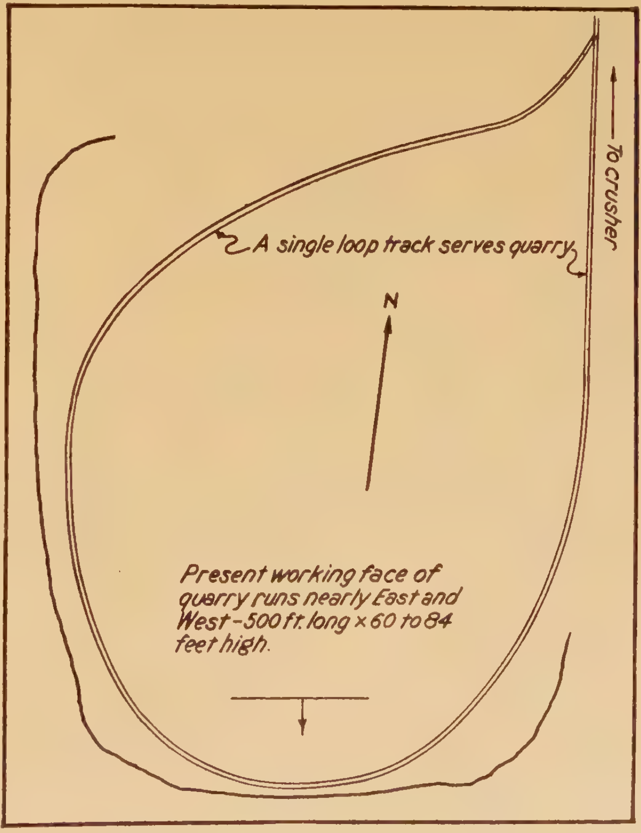
To crusher
A single loop track serves quarry
N
Present working face of quarry runs nearly East and West - 500 ft. long × 60 to 84 feet high.

Figure 2. Plan of quarry and track

position of the overburden is as follows: CaO, 5.5; SiO_2, 59.8; Fe_2O_3, 6.4; Al_2O_3, 14.3; MgO, 2.9; loss on ignition, 10.0; undetermined, 1.1. The ratio of overburden to stone is about 1 to 50 by weight.

Quarrying operations are confined to materials suitable for the cement mixture, so there is no waste from the quarry, all the stone going to the mill. The output varies from 1,500 tons per day for full mill operation to 1,000 tons per day for restricted operation. The overburden included in this output is about 2 per cent of the total tonnage. The quarry operates in the daylight hours only and averages about 10½ hours a day.

Crushing and Screening

Crushing and grinding practices are described with operating and technical details. The grinding is wet throughout and tabulations show the feed and discharge analyses of each product together with repair and power costs.

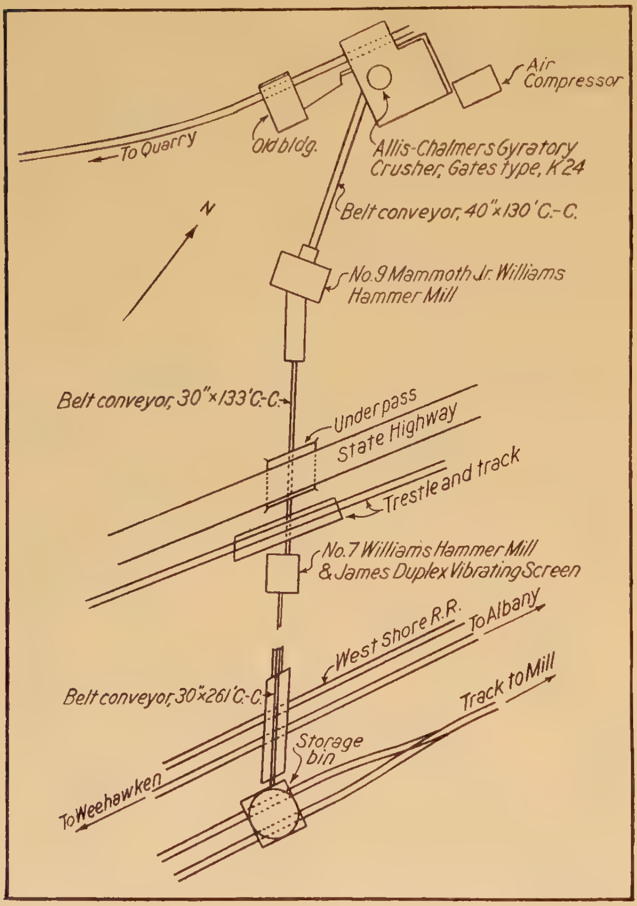
Air Compressor
To Quarry
Old bldg.
Allis-Chalmers Gyratory Crusher, Gates type, K24
N
Belt conveyor, 40"×130' C.-C.
No.9 Mammoth Jr. Williams Hammer Mill
Belt conveyor, 30"×133' C.-C.
Underpass
State Highway
Trestle and track
No.7 Williams Hammer Mill & James Duplex Vibrating Screen
West Shore R.R.
To Albany
Track to Mill
Belt conveyor, 30"×261' C.-C.
Storage bin
To Weehawken

Figure 3. Layout of crushing plant

Broken stone is loaded by steam shovel to cars hauled over a loop track by steam locomotive to the crushing plant.

Crushing Process

The 1,500 tons of stone (plus overburden) quarried per day passes successively through a gyratory crusher, a large hammer mill, and a small hammer mill. About 150 tons of clay is added at this point and passes through the ball mills and the tube mills with the stone, each of the two ball mills handling about half the total tonnage and each of the four tube mills handing about one-quarter of it. There is no sizing during the process, except that a screen with ⅝-in. openings removes about one-third of the discharge of the large hammer mill as undersize which bypasses the small hammer mill. However, upon completion of the new screen equipment the stone-clay-water slurry will be screened at the ball mills. Figure 3 shows the layout of the crushing plant.

Cost Tables Included

Cost tables are given for the year 1930, both in dollars and man-hour units.

Copies of this information circular may be obtained from the United States Bureau of Mines, Department of Commerce, Washington, D. C.

American Cement Company Building Branch Plant in Brazil

Three-Million Dollar Plant and Property Involved—To Open in Year

Construction of a branch cement manufacturing plant has been started by an American cement company in the State of Rio de Janeiro, Brazil, following a study of this market extending over several years, according to U. S. Trade Commissioner Harvey Sheahan, of Rio de Janeiro.

The plant and property involve an investment of $3,000,000, and the maximum daily capacity will be about 3,000 bbl. It is expected that the manufacture of cement can be started in January, 1933. The wet process will be installed, and a limestone deposit discovered by one of the company's engineers will provide the raw material.

At present there is only one cement plant operating in Brazil—the plant at Perus, near the city of Sao Paulo, owned by the Companhia Brasileira de Cimento Portland, S. A., and having a daily maximum capacity of 3,200 bbl. The controlling interest in the plant at Perus is owned by Canadian interests.

The plant now under construction will be operated as a subsidiary of the American cement company that is financing its construction.

Governor Claims Political Capital Made of Plant Closing

Announcement of the temporary closing of the Lone Star Cement Co., Louisiana, plant at New Orleans on November 14 because the city was buying its cement from "outside" firms was characterized by Governor Huey P. Long as "poppycock" and as an obvious attempt to make political capital out of the closing of the plant.

In his statement announcing the suspension, Vice-President Sawyer was quoted as placing responsibility on the city because paving contractors bought cement from outside companies instead of patronizing the local industry.

In refutation of the cement company's contention, Governor Long charged that when contractors on the new state capitol building at his request bought their cement from the New Orleans plant of the company, the firm had, notwithstanding, shipped the cement to Baton Rouge from the Birmingham plant of the Lone Star Cement Co., Alabama.

Some Progress in Cement Industry in Spite of Obstacles

Stronger Plants Modernizing Their Equipment—Several Companies Developing Water Transportation—Expected Mergers May Repeat Industrial History

CEMENT shipments during the first 11 months of 1931 have reached the total of 122,323,000 bbl. With shipments for December estimated, it is believed that the total for the year just closed will be about 127,000,000 bbl., or slightly less than 50 per cent of the present capacity of the industry.

In spite of the difficulties under which the cement industry has operated in 1931, progress has been made and certain trends have become more clearly defined.

Using Water Transportation

The increasing use of water transportation for the shipment of bulk cement is one of the developments noted in the direction of distribution. In the early months of 1931, for illustration, the Marquette Cement Manufacturing Co. extended its barge transportation to the Illinois River, mainly for the purpose of shipping cement in bulk from the company's plant at Oglesby, Ill., to its cement storage terminal at St. Louis. The experiment has proved a success and is expected to be continued. For several years this company has made similar shipments from its plant at Cape Girardeau, Mo., on the Mississippi River. The combined capacity of the four barges in this service is about 20,000 bbl.

The Universal Atlas Cement Co. placed a new self-unloading bulk cement barge into service on Lake Michigan late in 1930. This vessel, which has a capacity of 9,500 bbl. of cement, has been employed during the past year in transporting cement in bulk from the company's plant at Buffington, Ind., to distributing warehouses at Milwaukee and other lake ports. The Canada Cement Transport Co. also placed a new self-unloading vessel, with a capacity of about 16,000 bbl., into service late in 1930, for transporting cement in bulk to points on the Great Lakes, the St. Lawrence River and the Atlantic Coast.

Special Cements to the Front

During 1931 several companies introduced new brands of high-early-strength cements, and improvements in the Super Cement process were brought to a culmination early in the year.[1]

There seems to be little question that cement users are keenly interested in high-early-strength and other special cements, and that a pronounced development of the demand for these cements will be seen in the next few years.

Marketing and Distribution

The difficulties of marketing and distributing cement under the highly competitive conditions prevailing have been emphasized during the past year, and have led the stronger minds in the industry to a full realization of the need for a sane solution of marketing problems. Cement plant chemists and engineers have complained, and with good reason, that advantages from improved processes and improved mechanical installations that result in reduced costs, however slight, are promptly passed on to the user in the form of lower prices.

New Methods of Burning

The return of the modernized shaft kiln, especially for plants of small and moderate size, has been noted in several new and reconstructed plants in European countries.[2] These kilns, of course, represent a complete modernization and the elimination of most of the defects of the older types of shaft kilns.

Experiments are also being conducted at a European cement plant with equipment designed for burning or sintering cement clinker on a traveling grate.[3]

Stronger Plants Installing Machinery

Aside from the building of several small plants in Mexico, in regions within shipping distance of plants located in the United States, little has been done in the direction of new plant construction in 1931.

On the other hand, much has been accomplished by the stronger plants toward modernization of their equipment. Several large plants changed from the dry to the wet process, and a number of plants installed equipment such as long kilns, dust collectors, clinker coolers, slurry filters, and related equipment.

Will This Lead to Mergers?

Lower production costs or an improved product, and sometimes both, quite naturally constitute the purpose back of most of these installations. Many of them, perhaps unfortunately, result more or less automatically in increased capacity. In fact the increased capacity may in some cases be the principal factor in the lower unit production costs.

One question that arises is whether the thoroughly modernized plants can reduce their production costs to the point where a profit can be made, even at present market prices. If this can be done, and if, as a result, prices stay about at present levels, the situation will lead quite logically to the absorption of some of the weaker plants by the stronger. That this move is contemplated was indicated quite clearly in newspaper announcements given out in November.

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[1] See *Cement Mill Edition* of CONCRETE, April, 1931, pp. 101-103.

[2] See *Cement Mill Edition* of CONCRETE, October, 1931, pp. 62-65; November, 1931, pp. 58-61; and December, 1931, pp. 53-55.

[3] See *Cement Mill Edition* of CONCRETE, September, 1931, pp. 59-63.

Repeating Industrial History

If the trend is headed toward mergers and absorptions, and the eventual consolidation of the industry into a comparatively small number of closely organized groups, industrial history will only be repeating itself. This is the course that has already been run by many of the older industries in this country, while a similar course has actually been run by the German portland cement industry.[4]

Prospects for 1932

While little can be said at this time as to prospects for 1932, letters received by CONCRETE from state highway departments indicate that concrete road construction in 1932 will be about equal to that of 1931. In this respect prospects for the industry are good.

It is estimated that, of the 127 million barrels shipped in 1931, about 37 million barrels were used in concrete road construction. Concrete streets and alleys consumed about 8 million barrels more. These two markets will probably require about the same amount, or 45 million barrels, in 1932. The remainder, amounting to an estimated total of 82 million barrels, was consumed in all other forms of concrete construction and concrete products, including concrete base for other types of pavement. It can be said that this figure was much lower for 1931 than in any other recent year, so that the quantity of cement required for this miscellaneous construction in 1932 may at least be equal to 1931.

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[4] See *Cement Mill Edition* of CONCRETE, January, 1931, pp. 90-91.

Mexican Cement Industry Outlined in Commerce Report

Two New Plants Completed During 1931—Cement Made to Customer's Specifications

Until quite recently lime mortar was used for all Mexican building. Even today many 1-story brick structures embody mortar joints, but portland cement is displacing the use of slacked lime with great rapidity. Modern commercial buildings are patterned after American reinforced concrete structures. In the suburban sections of Mexico City, where residential construction proceeds at a pace fairly regular although slow, large billboards urge builders to "stick the brick with portland cement."

Colored Concrete Tile

Mexican residential construction on the high central plateau is confined almost entirely to the use of brick walls, plaster finished. Mexican architects have developed a style involving the use of brightly colored mortars finished in a diversity of modern plastic textures and varicolored tiles, which produce a very pleasing effect. Manufacture of tiles is an old industry in Mexico, but whereas the old tiles were made of baked glazed clay, the modern product is made of colored mixtures of white cement. These tiles are used for wall decoration, fountains, garden walks, floors, walls, and wainscoting. The exterior plaster finish, applied to the better-constructed residences, is also made with white cement. Bright colors are favored.

Produce United States Standard Portland Cement

Mexico has seven domestic cement plants (see Minerals Circular No. 3). In 1930, when only five were operating, production was reported as 1,514,630 barrels of portland cement, greatly below their estimated maximum capacity of 2,310,000 barrels. Completion of two more plants this year increases the capacity. Actual production has been increased each recent year. Economic depression and reduction of government construction, however, are causing some apprehension as regards future sales, and it is reported that one of the older plants—La Cruz Azul at Jasso, Hidalgo—may be closed temporarily.

Practically the entire output of the Mexican industry is confined to portland cement conforming to United States standard specifications. Practically all white cement, used considerably in plaster facings, cast stone, and tiles, is imported generally from the United States. Two American manufacturers are represented in Mexico, one by a Mexican manufacturer, who accepted this agency after failing in several attempts to manufacture white cement, owing to unsatisfactory local raw materials.

Portland cement of Mexican manufacture is made in accordance with the customer's wishes. If a quick-setting product is needed, the factory can mix any type from flash set to slow (10 hours). The hardening process also can be speeded, but all grades except flash set require the customary 28 days, or slightly less. The gypsum necessary to the production of the different "sets" usually is found scattered through the regular calcium rock deposits. —*From Commerce Reports, Dec. 14, 1931, by Archibald F. Coleman, Asst. U. S. Trade Commissioner, Mexico City.*

Shippers Seek Rate Cut from South Dakota Plant

Complaints of shippers who are seeking reduced rates from the South Dakota state cement plant at Rapid City to points in the northern portion of the state were heard by the South Dakota board of railroad commissioners at Pierre, S. D., on December 1.

Because of construction of a track connection between the Northwestern and Milwaukee railroads at Faulkton, the distances by rail from Rapid City to several destinations have been substantially reduced, shippers claim, and are seeking to have rates cut correspondingly.

British Cement Exports for 1931 Show Decrease

British exports for the nine months up to October 1, 1931, amounted to 2,962,015 bbl., compared with 4,910,492 bbl. exported during the corresponding period of 1930.

The bulk of the shipments were to parts of the British Empire; the largest, as usual, to the Irish Free State. With the exception of the shipments to Ireland, all exports were below the corresponding ones for 1930. Decreases were particularly prominent in sales to African and South American countries.

Some Basic Objectives for 1932

(From Report of National Conference of Business Paper Editors)

IN a report entitled "Objectives for 1932," Committee No. 9 of the National Conference of Business Paper Editors, an organization having a membership of about 140 business publications, recently set up a list of principles to guide them in their efforts toward constructive accomplishment during the year that has just begun.

Some of the principles stated are so directly applicable to the cement manufacturing industry that they are worthy of being "read, marked and inwardly digested" by the men who have the control of this industry in their hands. These principles are stated in the numbered paragraphs that follow:

1. There should be more equitable distribution of employment. This can be effected by (a) shorter working hours per individual per day; (b) shorter working weeks; (c) rotation of employment to provide work for a maximum number, but as here proposed does not involve a simultaneous increase in rate of pay per hour, per day or per week. This practice should be extended into those industries which have not yet taken it up and should include public utilities, railroads, and all departments of the federal, state, county, municipal and township governments.

2. We feel employment is the only real solution for unemployment. Emphasis should be placed upon the fact that unemployment relief charities provide only temporary relief and merely postpone the real issue. Recognition of this principle is further argument for early, widespread adoption of more equitable distribution of employment as recommended above.

3. It is a universal responsibility to see that abuses do not grow out of wage reduction policies.

4. We recommend that economically sound unemployment insurance plans should be undertaken through the voluntary co-operation of employers and employees. These plans should rigidly exclude governmental contributions, doles and charities upon the grounds that governmental unemployment payments, be they federal, state or local, are not a true cure for unemployment.

5. Obsolete machinery and methods should be eliminated. There should be widespread recognition of the fundamental reasoning that mechanization of industry has been greatly responsible for increasing volume of employment, rate of pay, the average standard of living and our national prosperity. It can easily be shown that countries with full employment but without mechanization enjoy neither a high degree of national prosperity nor a high average standard of living. It must be admitted that progress in the mechanization of industry has caused production in certain fields to outrun consumption capacities in those same fields, in consequence causing technological unemployment. Technological unemployment merely emphasizes the continuous responsibility of business and banking to redirect along profitable lines the workers released by the progress in mechanization.

6. Good management carries the responsibility for creating, by intelligent research, new wants for human beings and new uses for utilizing man power. The profits of business in the future will largely depend upon how successful industries are in developing new products and new and wider uses for old products.

7. All business enterprises should devote more attention to the problems of sales management. The chief executives of every company should treat marketing as one of the most important elements in company management as a whole. Our hope of materially increasing the volume of employment, rate of pay and of affecting the all necessary shifting from producing too much of certain things to producing more of those things which will satisfy demands not yet satisfied lies in aggressive market research.

8. Business men and bankers should be constantly sold the idea that the success of any business should at all times be premised and maintained on the principle that "the degree of success of all business enterprises must in the long run depend upon the value and importance of the service to the consuming public."

9. Study should be given to the revision of the Sherman and other anti-trust laws to prohibit the extension of monopolies but to permit the extension of co-operation along those lines which are probably in the public interest.

10. Trade associations should enlarge their activities to a point where they can function as planning boards for their respective industries. In America we believe in individualism, but to insure this status we must spur co-operative action, particularly in broad industrial planning and the thorough research on which such planning must be premised.

11. Development of transportation of all kinds, but particularly of motor roads, should be encouraged in all countries of the world, and especially in those highly populated countries where the standard of living is lowest.

The Superintendent's Viewpoint of Safety in the Quarry

How a Skeptic Became a Convert—Managing Executive Must Believe in Possibilities of Safety Measures—Thorough Organization Needed

By E. M. GOULD
Quarry Superintendent, Marquette Cement Manufacturing Company, Cape Girardeau, Mo.

My early years were spent in the coal mines where accidents were plentiful and in those days practically no thought was given to accident prevention. From the coal mines I went to quarry supervision at various plants, until in the year 1924 I went to the Cape Girardeau plant of the Marquette Cement Manufacturing Company as quarry superintendent. This quarry had only been in operation about two months at that time and was operating under adverse natural conditions, twenty-four hours per day, and seldom getting enough stone to keep the kilns in continuous operation. Their La Salle plant which had been in operation a great many years had built up a very good safety organization and had a good record in accident prevention work, while our record at the Cape Girardeau plant was poor.

At about this time the management employed a young safety engineer and also sent down the safety engineer from the other plant for about a week and got us organized in accident prevention work. The engineer from the other plant was a very good speaker, with considerable experience in this line, and through group meetings he got us pretty well sold on the safety idea for a start.

Each year thereafter our record showed improvement and we watched it with great satisfaction. During 1928 we were first successful in reaching our goal. The record from 1924, when safety work was started, to date is as follows:

Year	Man-Hours	Lost-Time Accidents	Days Lost	Fatalities	Permanent Disabilities
1924	198,806	16	324	1	1
1925	351,498	6	42	2	0
1926	207,386	3	70	0	0
1927	216.707	4	119	0	1
1928	212,921	0	0	0	0
1929	197,327	0	0	0	0
1930	224,512	0	0	0	0
1931	to date	0	0	0	0

Changes Personal Views on Safety

I well remember my personal view at the time we started. I felt that guarding the machinery and making unsafe places was O. K., but when it came to educating the men to work safe it was all "tommy-rot," as who in the world would get hurt on purpose? It really seemed ridiculous to go around telling men to be careful, as I felt that it was only natural for men to avoid injuring themselves. But as this was the policy of the company, I felt it was my duty to carry out this policy the same as any other policy or rule the company made. The first two years of our safety activities were not so encouraging although very interesting. One great drawback was that we had a very large labor turnover. Had it not been for this, I feel our record for the first two years would have been very much better.

By the end of the first two years I had seen enough improvement that I was fully convinced that there was such a thing as educating the workmen to the extent that they would be much more careful of themselves as well as their fellow workers. I was personally converted to the "Safety Gospel" and have been a disciple in accident prevention work ever since.

I think it can be said that the quarry employes as a whole went through about the same process of evolution in accident prevention as myself.

Executive Must Believe in Safety

The foregoing statements are given, not to show any achievements in accident prevention work on my part, but to impress on the minds of any executives who may be here and that to date have made no efforts in preventing accidents in their organizations, that no matter how bad their present records are or how set their key men are against the proposition, they too can perfect a smoothly functioning safety organization and absolutely stop lost-time accidents if they will determine that accidents must stop and then organize their men to that end.

Our past record is not the product of any one man but the result of the organized effort of all our men. If I were to mention any single person in our organization to place more than equal honor upon, it would be our safety engineer, Mr. Greer, as his whole time is devoted to this work and under his leadership we have been able to build up a wonderful safety record.

It is true that years ago the general impression was that accidents must happen, and that no man would intentionally injure himself, and therefore it was useless to preach safety, or to spend money in educating men to be careful. But the progress made in accident prevention work in the past decade is so great that it seems as if there is absolutely no excuse whatever for the heads of any organization to longer take this attitude. In fact it is nothing less than criminal negligence for any industry to go ahead maiming and killing men when it is in their power to stop most of these accidents. From the great number of accidents reported each year, there are undoubtedly many organization heads still taking the attitude that accident prevention work is all "tommy-rot." If these same organization heads did not give any more thought or energy to production and sales than they do to safety work, they would go in the hands of the receiver in a short time.

If you were to ask me for my opinion on how to perfect an organization in accident prevention, my answer would be as follows: The head of the organization must make up his mind that he is going to stop accidents and that he *doesn't mean maybe*. This, in my opinion, is one of the most important features of the program, because when the organization head really makes up his mind that accidents must stop, then he will put the idea over to his superintendents and foremen the same as he would any other important operating program, which will practically insure its success.

Definite Plan Needed

Next map out a definite plan or program. I suggest that the services of an experienced safety engineer be obtained for at least a week, if not permanently, to make a survey and then outline the program. If for any reason you do not wish to keep an experienced engineer after the program is decided upon, you might pick some man in

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Abstracted from paper read before Twentieth Annual Safety Congress, Chicago, Ill., Oct. 12-16, 1931.

your organization who will follow the program to the letter. In selecting this man, be careful to select a man who is a good mixer, one whom the men like and have confidence in and one who is a fair talker and is sold 100 per cent on safety work himself.

The next move is to sell the idea to the superintendent and foremen. This sometimes is not as easy as it may seem, but the success of the venture absolutely depends on this, and should it happen that any one of these key men cannot be sold on the idea after persistent effort, there can be but one remedy left and that is to replace him.

A superintendent or foreman must be completely sold on safety work himself in order to put the idea over to his men to the extent that accidents will be entirely eliminated, because it does not take long for the men to see if their boss really believes and practices what he preaches.

It has been our experience that it is a great stimulus to safety work to allow our workmen and foremen the privilege of drafting our yearly safety program.

The effort required to eliminate accidents is no less than whole-hearted co-operation, and the entire organization from the president down to the water boy can be compared to a chain in which each man represents a link; and if one man gets hurt, the record is broken the same as is true of the chain when a link is broken. So every man in the organization must believe and practice safety if a perfect record is to be attained.

If a small per cent of the money that is paid out for insurance, or for compensation where insurance is not carried, were spent for a well organized, continuous accident prevention program, faithfully followed, along with plenty of thought and persistent endeavor, a great many industries would show a big financial saving as well as a great saving of pain, grief and fatalities to their employes. In closing I want to ask you to remember, "You pay more for safety when you try to do without it."

What Taxes Should Be Reduced?

In a letter addressed to the editor of *American Builder and Building Age*, and printed in the November (1931) issue of that publication, B. F. Affleck, president of the Universal Atlas Cement Co., makes a comprehensive analysis of taxes and public expenditures.

Mr. Affleck's letter was inspired by an editorial in which large expenditures for "hard roads" were criticized.

In his analysis he classifies governmental expenditures into the following four general groups:

(1) Funds that are wasted (estimated at 40 per cent of total taxes collected).

(2) Funds that are spent injudiciously for purposes from which little or no benefit is derived.

(3) Funds spent for necessary things, but far out of proportion to the benefits derived.

(4) Funds spent for necessary and beneficial purposes such as good roads, from which nearly everyone benefits.

In the data supporting his arguments he points to the following facts:

(1) In 1928 the federal government spent $81,281,000 on federal aid highways, or only about 2 per cent of total federal government expenditures for that year.

(2) In 1928 the total amount of $1,872,281,000 was spent on highway construction throughout the United States, by all federal, state and local governments. This was about 15 per cent of the total of all governmental expenditures.

(3) State and local governments expended $1,791,000,000 for highway construction in 1928, or about 20 per cent of their total expenditures of that year, which amounted to $8,639,000,000.

Further comparison is made between the expenditures of state and local governments for good roads and for other major purposes. The point is brought out that in 1928, when, as stated, the expenditures for good roads amounted to 20 per cent of the total, these same governmental units spent 28 per cent of total receipts for education, and 17 per cent for charity and social welfare.

Accepting these two expenditures as necessary, Mr. Affleck enumerates a number of items of governmental expenditure whose complete elimination would be of benefit to all taxpayers. Among these items he lists "government in business," pointing out that federal, state or local governments have at various times engaged in the operation of shoe factories, printing plants, oil stations, grain elevators, cement plants, and some 70 other industrial projects, with the invariable result that taxpayers have been compelled to make up the deficits.

Mr. Affleck's analysis contains much information that should be effective in counteracting propaganda against the construction of paved highways.

Entry Made in Northwestern States' Stockholders' Suit

An entry in the injunction suit brought by a stockholder seeking to prevent the reorganization of Northwestern States Portland Cement Co. was made by the presiding judge at Mason City, Iowa, on November 30.

The defendant's two motions asking the striking out of parts of the petition and for more specific statement are denied.

The suing stockholder, F. A. Oentjes, Mason City attorney, is attempting to halt the completion of the reorganization of the company from West Virginia to Iowa.

The petition, first filed in January, 1931, states that Oentjes owns 100 shares of common stock of the West Virginia company, which has a par value of $100 and that under the proposed plan four shares of common stock of no par value, of the Iowa corporation, are to be issued in exchange, it is reported.

The reorganization plan was first submitted to stockholders in July, 1930.

Lehigh Indiana Plant Reopens for Winter Run

The Mitchell, Ind., plant of the Lehigh Portland Cement Co. is to resume operation on Monday, January 4, according to an announcement by Supt. W. H. Weitknecht. It is expected that operation will continue throughout the winter.

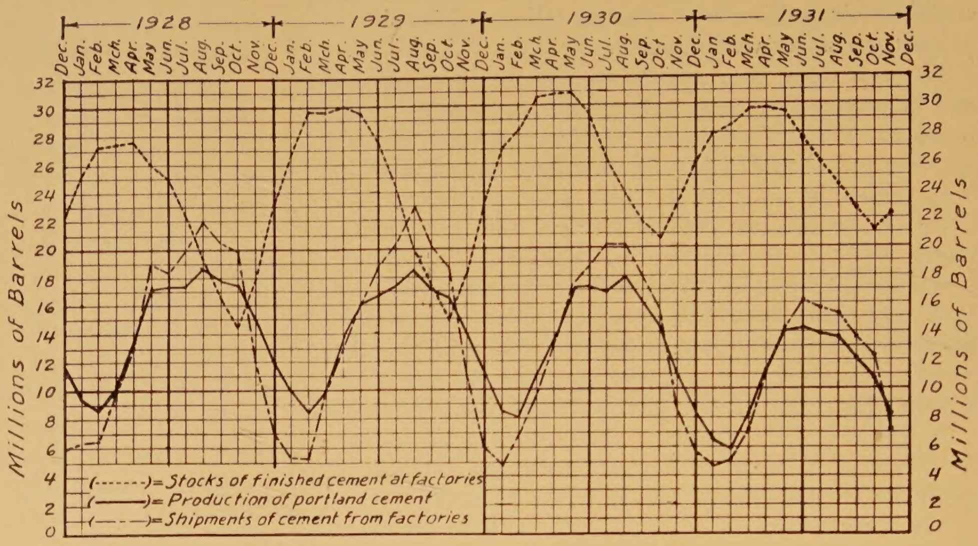
The plant was allotted a contract for 33,000 bbl. of cement in a letting by the state highway commission early in December.

Cement Statistics for November

1931 November Stocks Are Down More Than 3 Per Cent

Relation of Production to Capacity

	The Month, Per Cent	The Twelve Months, Per Cent
November, 1931	37.2	44.4
November, 1930	51.7	62.6
October, 1931	47.4	48.6
September, 1931	55.3	50.2
August, 1931	60.2	52.0



	1930	1931	Increase or Decrease, %
Production, November	**11,098,000**	8,161,000	—26.5
Shipments, November	**8,784,000**	7,156,000	—18.5
Stocks at end of month	**23,056,000**	22,223,000	—3.1

	1930	1931	Increase or Decrease, %
Total production for yr.	**152,425,000**	118,596,000	—28.2
Total shipments for yr.	**144,272,000**	122,323,000	—25.1
No. of plants reporting	165	165	0

Production, Shipments, and Stocks of Finished Portland Cement, by Districts, in November, 1930 and 1931, and Stocks in October, 1931 (In Barrels)

District	Production—November		Shipments—November		Stocks at end of month		Stocks at end of October, 1931*
	1930	1931	1930	1931	1930	1931	
Eastern Pa., N. J. and Md.	**2,390,000**	2,046,000	**2,124,000**	2,064,000	4,521,000	**4,649,000**	4,668,000
New York and Maine	**924,000**	686,000	617,000	**661,000**	**1,395,000**	1,185,000	1,159,000
Ohio, Western Pa. and W. Va.	**1,085,000**	769,000	**830,000**	581,000	3,285,000	**3,310,000**	3,122,000
Michigan	**943,000**	385,000	**538,000**	267,000	**2,722,000**	2,011,000	1,893,000
Wis., Ill., Ind. and Ky.	**1,233,000**	894,000	**857,000**	761,000	**2,922,000**	2,485,000	2,352,000
Va., Tenn., Ala., Ga., Fla. and La.	**877,000**	733,000	**807,000**	763,000	**1,767,000**	1,654,000	1,684,000
Eastern Mo., Ia., Minn. and S. Dak.	**1,131,000**	827,000	**739,000**	474,000	1,934,000	**2,725,000**	2,372,000
W. Mo., Nebr., Kans., Okla. and Ark.	**743,000**	566,000	**632,000**	475,000	**1,763,000**	1,311,000	1,219,000
Texas	**502,000**	459,000	**453,000**	378,000	**769,000**	639,000	558,000
Colo., Mont., Utah, Wyo. and Idaho	40,000	**97,000**	**118,000**	85,000	335,000	**485,000**	474,000
California	**817,000**	555,000	**728,000**	527,000	1,100,000	**1,114,000**	1,086,000
Oregon and Washington	**413,000**	144,000	**341,000**	120,000	543,000	**655,000**	631,000
	11,098,000	8,161,000	**8,784,000**	7,156,000	**23,056,000**	22,223,000	21,218,000

Production, Shipments, and Stocks of Finished Portland Cement, by Months, in 1930 and 1931 (In Barrels)

Month	—Production—		—Shipments—		Stocks at end of month	
	1930	1931	1930	1931	1930	1931
January	**8,498,000**	6,595,000	**4,955,000**	4,692,000	27,081,000	**27,759,000**
February	**8,162,000**	5,920,000	**7,012,000**	5,074,000	28,249,000	**28,612,000**
March	**11,225,000**	8,245,000	**8,826,000**	7,192,000	**30,648,000**	29,676,000
April	**13,521,000**	11,245,000	**13,340,000**	11,184,000	**30,867,000**	29,715,000
May	**17,249,000**	14,010,000	**17,224,000**	14,200,000	**30,891,000**	29,554,000
June	**17,239,000**	14,118,000	**18,781,000**	16,077,000	**29,364,000**	27,602,000
July	**17,078,000**	13,899,000	**20,153,000**	15,545,000	**26,289,000**	25,934,000
August	**17,821,000**	13,549,000	**20,299,000**	15,172,000	23,824,000	**24,313,000**
September	**16,124,000**	12,092,000	**18,083,000**	13,671,000	21,889,000	**22,736,000**
October	**14,410,000**	10,762,000	**15,599,000**	12,360,000	20,697,000	***21,218,000**
November	**11,098,000**	8,161,000	**8,784,000**	7,156,000	**23,056,000**	22,223,000
December	8,480,000	....	5,688,000	....	25,838,000	....
	160,905,000	....	158,744,000	....	....	....

*Revised.

Blacker type indicates larger of two figures.

MEN and MILLS [News of and for Cement Mill Men]

A clearing-house page for all kinds of local cement mill news—to promote the comradeship and mutuality of interest that exists among those who make portland cement.

Readers in all mills, even though not regular contributors, are invited to send in news notes about personal and plant activities that may be of interest or value to the men in other mills.

MacNider to Resign U. S. Ministry to Canada, Report

Col. Hanford MacNider, president of the Northwestern States Portland Cement Co., and United States minister to Canada, will resign from the latter position next spring, according to associates.

Upon his acceptance of the ministry in the spring of 1930 MacNider was instructed to aid in getting an agreement on the St. Lawrence waterway project. Since direct negotiations are under way, his friends say, his mission as minister is completed.

W. F. Reid, British Cement Pioneer, Passes Away

Walter Francis Reid, who was formerly a well-known British technologist, died in London recently, aged 80. Mr. Reid's father, who was an engineer under Brunel, was one of the first manufacturers of portland cement, establishing a pioneer plant at Leeds.

Mr. Reid himself was interested in cement research and started a cement plant at Rugby. After graduating at the Berlin School of Mines in 1880, he studied the rusting of iron and steel, and found sulphur in all iron that rusted easily, while pure iron had very little tendency to rust.

Later, Mr. Reid was commissioned to report on the mineral resources of Argentina, where he traveled in many wild parts, depending on his gun for his daily food. The weapon becoming rusty, he began a series of experiments which led to the production of a smokeless cellulose powder, partially gelatinized, which became popular under the name "E. C. Powder." The manufacture of linoleum was another industry which benefited by his technical researches.

An original member of the Society of Chemical Industry, Mr. Reid was elected its president for 1910-11, and was awarded the society's medal for 1910-11. He was one of the six delegates who went to Paris in 1919 to assist in forming the International Union for Pure and Applied Chemistry, and he was a Fellow of the Chemical Society. He was formerly a governor of the National Physical Laboratory, Teddington.

Mr. Reid is survived by a son and daughter.

Correction

R. W. Willson, chief chemist for the Southwestern Portland Cement Co., advises that he is not supervising the tests of Hoover dam cement. An item stating that he was in charge appeared on these pages in December.

The tests are under the supervision of a United States Reclamation Service representative, under the direction of Prof. Raymond E. Davis.

A. C. Tagge Made Honorary Member of P. C. A.

A. C. Tagge, now residing at Monroe, Mich., and for many years president of the Canada Cement Co., has been elected an honorary member of the Portland Cement Association.

He is the third man in the history of the association to be given this honor.

Death of George Washburn Follows Illness

George Washburn, 57, repair foreman at the Hudson, N. Y., plant of the Lone Star Cement Co., New York, Inc., died December 4. He had been ill four days.

Mr. Washburn had been the oldest foreman, in length of service, with the company, having first joined it twenty years ago. He was reputed "a tireless worker, a wonderful leader in safety work." Until an unavoidable accident recently, he had led his men without a lost-time accident for more than 4 years.

Lone Star Cement Plant Loyal to Kansas

Five per cent of all coal produced in Kansas is used by the Lone Star Cement Co. plant at Bonner Springs, Kansas. And it is the only fuel used, according to recent publicity given these facts locally.

In a statement the firm says, "We have always used Kansas coal in this plant. This is our contribution to the permanent relief of unemployed miners. We see no reason why any other coal should be used in Kansas."

Duvall Succeeds Blank as Superintendent of Ironton Plant; Sherward Resigns

S. L. Duvall, of Youngstown, Ohio, has been named general superintendent of the Superior, Ohio, cement plant of the Wellston Iron Furnace Co. He succeeds John A. Blank of Ironton, Ohio, who has resigned.

Floyd Sherward, sales manager, has also resigned, as has Mrs. Marguerite Morris, chief clerk. The latter is succeeded by Fred Hankins of Superior.

As a result of the purchase by the Southern Ohio Power Co. of the majority stock in the Wellston Iron Furnace Co., a new board of directors has been formed and other changes in the company's personnel have taken place.

Manitowoc Roof Burns; Coal Dust Cause

Coal dust on the metal roof of the Manitowoc Portland Cement Co. plant at Manitowoc, Wis., ignited early in the morning of December 3. Firemen remained on the job an hour and a quarter, but no substantial damage to the roof or the plant occurred.

Marquette Gets 60,000-Barrel Contract from U. S.

The Marquette Cement Manufacturing Co. was awarded a contract for 60,000 bbls. of cement at $78,000 by the U. S. Engineer office, Memphis district, on November 11.

S. T. Crapo Re-Elected Federal Reserve Director

Stanford T. Crapo, secretary-treasurer of the Huron Portland Cement Co., Detroit, Mich., has been re-elected a Class B director of the Federal Reserve Bank of Chicago. His term expires December 31, 1934.

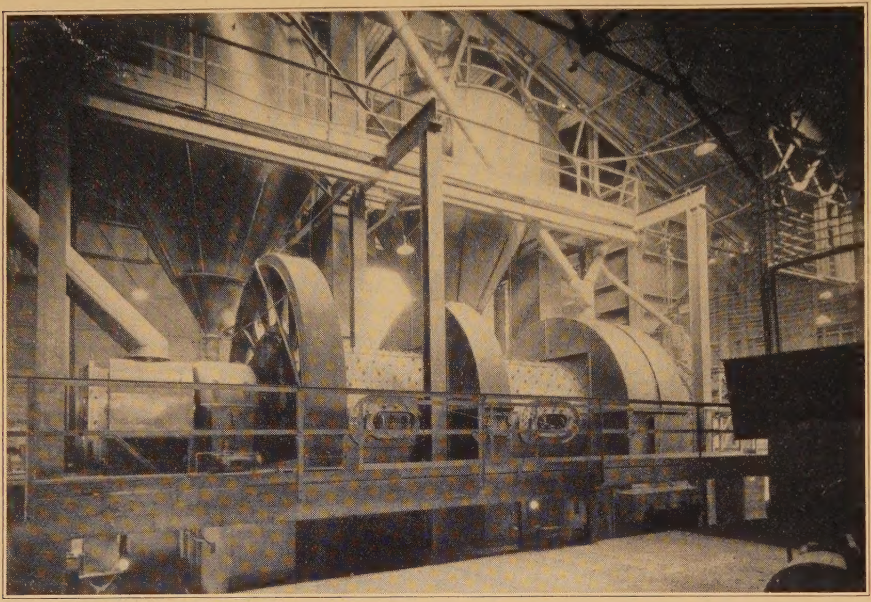
Joseph Ulman, Penn-Dixie Safety Engineer, Passes

Joseph Ulman, for the past ten years safety engineer at Penn-Dixie plant No. 3 at Richard City, Tenn., passed away on December 8.

Mill Equipment

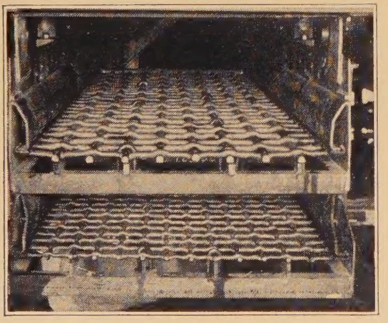
Compeb Mills and Screen Improvements in 1931

Its outstanding developments in crushing and cement making machinery in 1931 were those on two large compeb mills and a centrifugal vibrating screen, according to the Allis-Chalmers Co., Milwaukee, Wis.



The details and performances are described as follows:

"During 1931 two large compeb mills were put into operation for dry grinding of raw materials. The capacity of these mills materially exceeded expectations and demonstrated the value of the circuit under which they operate.



"These mills are 9½ ft. in diameter in the preliminary compartment and 8 ft. in diameter in the finishing compartments. Both mills have three compartments, one of which is 35 ft. long and the other is 40 ft. long overall. The air separator circuit on these mills consists of classifying the material discharged from the first compartment with the production of finished material and a coarse reject which is sent to the second compartment. The second air separator classifies the material discharging from the second compartment and produces finished material. The rejects are passed to the third compartment of the mill which is operated in open circuit.

"In one case provision was made to send the material discharged from the third compartment to the air separator if it was so desired. With the use of this circuit the circulating load of fine material has been eliminated with resultant economies in operation. The 9½ 835 compeb mill installation of the Missouri Portland Cement Company, Independence, Mo., plant is shown in the first illustration.

"During the year we have made a number of improvements to the centrifugal vibrating screen. In the lower photograph is shown the improved type of screen suspension which has found considerable favor with operators; also during the year screens having one, two, or three decks have been developed in the 4 by 10-ft., 5 by 10-ft., and 5 by 12-ft. sizes."

Industrial Literature

Equipment Leaflets from General Electric

Following is some of the equipment on which loose leaflets have been issued recently by the *General Electric Co.*, Schenectady, N. Y., in replacement of earlier sheets: Solid-shaft vertical induction motors, general-purpose squirrel-cage induction motors, centrifugal air compressors, totally enclosed, fan-cooled induction motors, constant speed, direct current motors, Type BD direct current motors, mechanical drive turbines, and brakes for direct current motors.

Notes from the Field

Foxboro Co. Takes on Pyrometer Division

The pyrometer division of the *Wilson-Maeulen Co., Inc.,* New York City, has merged with the *Foxboro Co.,* Foxboro, Mass.

The entire personnel of the division has been combined with that of the Foxboro Co. It is felt that this consolidation of the knowledge and experience of these two organizations will prove an important step in the progress of this industry.

The merger follows twenty-five years of close and friendly co-operation between the two companies and is said to be made wholly in the interest of better service.

The Wilson-Maeulen Company specializes in the manufacture of electric indicating, recording and controlling pyrometers and electric resistance thermometers for temperatures up to 3,600 deg. F. By the inclusion of the outstanding Wilson-Maeulen temperature instruments, the Foxboro firm now offers a complete range of instruments of standardized quality.

The Rockwell hardness tester that has been manufactured by the Wilson-Maeulen Company is being built and sold by the Wilson Mechanical Instrument Company which succeeds the Mechanical Instrument Division of Wilson-Maeulen Co., Inc., and continues in the same factory and offices at 383 Concord Avenue, New York City.

The Wilson-Maeulen pyrometers and controllers are being built in the Foxboro factories.

Largest Coupling Order Received by Ajax

The Ajax Flexible Coupling Co., Westfield, N. Y., recently received an order for over 800 flexible couplings, all to be used on the conveyor drives to be installed in the new Chicago postoffice.

This is believed to be the largest order ever placed for flexible couplings for a single conveyor system.

Couplings with interchangeable identical flanges, using rubber bushings, graphited bronze bearings, alloy steel drive studs and requiring no lubrication, will be furnished.